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NATIONAL DAM SAFETY PROGRAM. VLY CREEK DAM, INVENTORY NUMBER NY--ETC(U)
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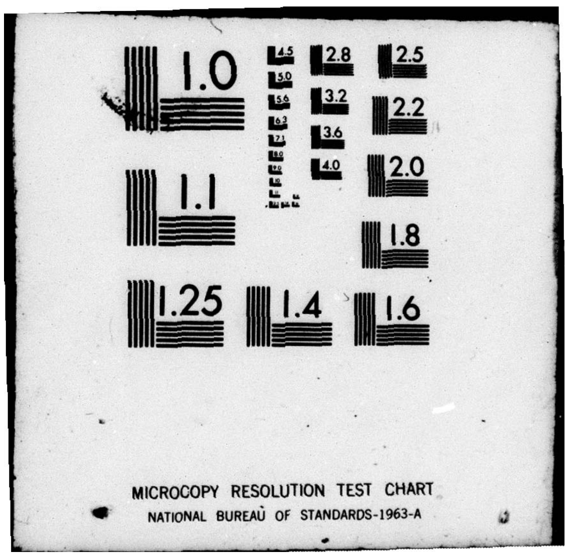
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Vly Creek Dam
Albany County
Vly Creek

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.
Vly Creek Dam was judged to be safe, no recommendations were made.

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LOWER HUDSON RIVER BASIN
VLY CREEK DAM
NY 96 & NY 97
PHASE I INSPECTION REPORT

TABLE OF CONTENTS

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Vly Creek NY 96 & 97 Lower Hudson W.S. (DEC #208-2378 & 208-2379)
State Located:	New York
County Located:	Albany
Stream:	Vly Creek (tributary of Coeymans Creek)
Date of Inspection:	July 13, 1978

[CONT'D FROM PAGE 1]

ASSESSMENT

Vly Creek Dam is composed of an earth embankment and a concrete spillway and the dike is an earth embankment, the visual inspection ~~of which~~ did not reveal conditions that are considered to be unsafe.

The total discharge capacity of the spillway is adequate to pass half the Probable Maximum Flood (PMF) regardless of the flashboards. The spillway is also capable of discharging PMF without flashboards, but not with flashboards.

George Koch
Chief, Dam Safety Section
New York State Department of
Environmental Conservation
N.Y. License No. 45937

Approved by:

Col. Clark H. Benn
New York District Engineer

Date: 28 September 1978

Overview of Vly Creek Dam

Looking West

Overview of Vly Creek Dike

looking west

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
VLY CREEK DAM I.D. No. 96
DEC #208-2378 & 208-2379
LOWER HUDSON WATERSHED
ALBANY COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

This report includes the combined Phase I Inspections of the Vly Creek Dam and Dike formerly listed as NY 96 and NY 97.

1.1 GENERAL

a. Authority
The Phase 1 Inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection
To evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property, and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

[CONT'D ON PAGE iii]

a. Description of the Dam and Appurtenant Structures
The Vly Creek Dam is composed of a 24.5 feet high and 338 feet long earth embankment dam with spillway, and a 39.5 feet high and 1720 feet long earth embankment dike with control tower for water supply regulation.

(1) Dam
The dam, located at the extreme southern end of the reservoir, has a crest width of 15 feet with an upstream slope of 1 vertical on 3 horizontal and a downstream slope of 1 vertical on 2.5 horizontal. The exposed slopes and crest are covered with grass. The portion of the upstream slope which was visible, is protected by riprap.

A central cut-off wall constructed of unreinforced concrete at least 2 feet thick and extending from 5 to 11 feet below grade was installed under the entire dam including the spillway. Bethlehem steel sheet piling SP-4 or equivalent was placed into the center of the cut-off wall such that the concrete lapped by the piling for a horizontal distance of 2 feet. The piling extends to elevation 396.0, 1 foot below top of dam.

The 49.75 feet wide spillway is composed of an unreinforced concrete ogee section with a crest elevation of 390.0 and a 200 feet long reinforced chute section. A 36 inch diameter reinforced concrete pipe serves as a reservoir drain, the reinforced concrete discharge channel of which joins the spillway chute section near its termination. A 36 inch gate valve located within a reinforced concrete drain-well, slightly upstream of the core wall, controls this low-level outlet.

(2) Dike
The dike, located at the extreme northern end of the reservoir, has a

crest width of 15 feet with an upstream slope of 1 on 3 and a downstream slope of 1 on 2.5. The visible portion of the upstream slope was protected by riprap.

A central cut-off wall consisting of Bethlehem steel sheet piling SP-4 or equivalent was installed under the entire dam except for a 400 feet long section near the westerly end. At this location, because of the stony nature of the soil, sheet piling could not be driven and a minimum 2 feet wide cut-off wall of unreinforced concrete was formed. This cut-off wall ranged from 11 to 18 feet in depth. The sheet piling cut off wall ranged from 12 to 31 feet in depth. The core wall of the dam was also steel sheet piling extending to elevation 396.0, 1 foot below the top of dam.

A gate house located on and within the upstream slope near the western end of the dike controls the flow from the reservoir. Three 24 inch gate valves regulate flow into a concrete chamber and the flow exits through a 24 inch concrete encased cast iron pipe to the treatment plant. A 42 inch diameter reinforced concrete pipe and gate valve serves as a reservoir drain and is located east of the gate house.

b. Location

The Vly Creek Reservoir is enclosed by a dike on the north and by a drain and a spillway on the south. The dike is on Vly Creek, a tributary of Normanskill, and is located 0.8 miles southeast of the Village of New Salem. The dam is located on a tributary of Onesquethaw Creek, a tributary of Coeymans Creek, and is situated 1.3 miles northeast of the Village of Clarksville. The water treatment plant is immediately below the dike.

c. Size Classification

The heights of the dam and dike are 24.5 feet and 39.5 feet respectively, and classified as low (below 40 feet).

d. Hazard Classification

The dam and the dike are classified as "high" hazard because of the numerous homes present downstream of both embankments.

e. Ownership

The reservoir is owned and operated by Town of Bethlehem, Water District No. 1.

f. Purpose

The reservoir provides storage for the water supply of the Town of Bethlehem.

g. Design and Construction History

The dam and its appurtenant structures were designed by Benjamin L. Smith & Associates, Engineers, 40 Stenben Street, Albany, NY 12207 and constructed in 1957 by D.A. Collins, Willow Glen, Mechanicville, New York.

h. Normal Operating Procedures

There is no minimum required water release at Vly Creek Dam or Dike. The treatment plant can draw water through any of the 3-2 feet diameter intakes situated at different elevations, but usually the middle intake is utilized.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi)	2.52
b. Discharge at Dam Site (cfs)	
Maximum known flood (spring, every year)	21
Maximum pool (El 395)	3200
Maximum pool w/flashboards (El 395)	1350
Maximum capacity of low level outlets	18
Total Discharge at Maximum pool (El. 397)	3218
Total discharge at Maximum pool w/flashboards	1368
c. Evaluation (USGS datum)	
Top of dam	397
Spillway Crest	390
Tail race channel	372
Invert Low level outlet	372.75
d. Reservoir	
Length of maximum pool, miles	2.1
Length of shoreline (spillway crest), miles	4.8
Surface area (spillway crest), acres	183
e. Storage (acre-feet)	
Spillway crest	3,100
Top of flashboards	3,600
Top of dam	4,500
f. Dam	
Embankment type	Earth
Embankment length, ft.	338
Upstream slope	1:3
Downstream slope	1:2.5
g. Dike	
Embankment type	Earth
Elevation	397
Embankment length, ft.	1,720
Upstream slope	1:3
Downstream slope	1:25
h. Spillway	
Type	Concrete Ogee
Length, Ft.	49'-9"
Crest elevation (USGS)	390
Upstream channel	379
Downstream channel	379

i. Regulating Outlets

Dam

Upstream: One sluice gate controls the flow to the 3 feet diameter low-level outlet (El. 374.25).

Downstream: None

Dike

Upstream: Three sluice gates at elevations 365, 375 and 385 control the flow to the 2 feet diameter water intake pipe (El. 361). Another sluice gate controls the flow to the 3.5 feet diameter low-level outlet (El. 357.25)

Downstream: None

All pipe elevations are center of pipe.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Geology

The Vly Creek Dam and Dike are located within the "Hudson - Mohawk Lowlands" physiographic providence of New York State. The Helderberg Escarpment lies about 1¼ miles northwest of the dike. The general topography of the area resulted from erosion along outcrop belts of weak rocks and is of low elevation and relief. Bedrock in the vicinity of the dam and dike is primarily Ordovician (500-435 million years ago) shales and limestones which have been exposed by the southward and westward stripping off of Silurian and Devonian limestones. The present surficial soil deposits have resulted from glaciations during the Cenozoic Era. Alluvial deposits are formed on the valley floor and glacial till is located on the valley walls and higher elevations.

b. Subsurface Investigations

A total of 23 test borings and 6 test pits were conducted during April and May 1955. The investigations were made by Hall & Co. Inc. Soil profiles along the axis of the dam and dike are included in Appendix A.

In general, the soil profile along the axis of the dike consists of soft gray fine sand and clay with lenses of very soft blue clay underlain by very hard gray sand gravel and clay. One boring in the center of the valley was progressed to elevation 257 with rock encountered at elevation 261. The soil profile in the abutment areas consisted of brown and yellow sand, clay and gravel with densities increasing with depth. The material on the west abutment included more gravel and was denser than the east abutment area.

The soil profile along the axis of the dam consists of hard brown clay some gravel and boulders with color changing to gray with depth. Rock was encountered at about elevation 358 in the center of the valley and it was 10 feet higher in elevation in the west abutment area and about 10 feet lower in the east abutment area.

c. Embankments and Appurtenant Structures

The dam and dike were designed by Benjamin L. Smith & Associates, Consulting Engineers, Albany, New York in 1955. A complete set of the 10 drawings for the project are included in Appendix A. The design specified steel sheet piling core walls for the dam and dike. The sheet piling was also used for a cut-off wall in the center and east abutment areas of the dike. A 24 inch thick unreinforced concrete cut-off wall was used in the west abutment area of the dike and under the entire dam structure because of the stony, dense nature of the soils. The sheet piling was to be embedded in the concrete cut-off walls where they joined.

The steel sheet piling in the cut-off wall under the dike was to be driven to a specific elevation. The soil profile indicates that there may be some permeable layers under the cut off wall. However, there appears to be a sufficient depth of impermeable soil under the dike to minimize any seepage problems.

The design also specified removal of the soft muck material in the area of the dike. The topsoil was to be stripped in all areas under the dam and dike. The soil profiles indicate that there are some thin layers of compressible materials in the central and east abutment areas of the dike. Steel sheet piling was used for the cut-off wall in these areas so the small settlements which probably occurred would not have a significant effect on the cut-off or core walls. Most of the settlements would have taken place during construction because the compressible layers are rather thin.

2.2 CONSTRUCTION RECORDS

There were no construction records other than photographs.

2.3 OPERATION RECORDS

The discharge into the water supply system is recorded daily. Reservoir levels and spillway discharges are recorded intermittently. All available maintenance and repair records are filed in the Town of Bethlehem Water District #1 headquarters. The dam and dike are visually inspected on an irregular basis.

2.4 EVALUATION OF DATA

The data presented in this report has been made available by the Town of Bethlehem. In addition, the personnel of Water District #1 have contributed observations of the structures' performance, operation and maintenance. This information appears adequate and reliable for Phase I Inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of Vly Creek Dam and the surrounding watershed was conducted on July 13, 1978. The weather was clear and the temperatures ranged in the seventies. The inspection was conducted during a dry period during which intermittent thunder storms occurred. The reservoir level at the time of inspection was 2.6 feet above the spillway crest due to the presence of flashboards. These flashboards were leaking slightly.

b. Embankments and Abutments

The earth embankments, which were completed in 1957, show no signs of distress. Some minor distoration of the horizontal alignment of the dike crest was observed, which can be attributed to settlement of the embankment. No detrimental affects could be discerned from this distoration. Vertical alignment of the dike and alignment of the dam were good.

No erosion or sign of instability in the slopes of the dam were observed. The grassy vegetation on the downstream and crest of the dike and dam is mowed 2 to 3 times each year. The upstream slopes are ripraped for their entire length. Some scrub growth was apparent in the riprap of the dike, and should be removed.

c. Seepage

No evidence of seepage was observed on the slopes, around the low level outlets, or the abutments. The downstream area below the toe of the dike is overgrown with large trees and considerable undergrowth. Vegetation associated with continued wet conditions is present within this area. Maintenance personnel stated that this area was wet prior to impoundment of water and is thought to be seepage from the hillside northeast of the dike. Vegetation below the toe is not objectionable so long as the growth is trimmed periodically to prevent encroachment along the toe.

d. Drainage and Instrumentation

No internal or external drainage system has been provided. Instead, a cut-off wall and core wall were installed to control seepage through the embankments. No observation wells, piezometers or weirs have been installed to monitor seepage conditions. Recorded reservior levels are based on the elevations of the spillway crest and the intake tower at the dike.

e. Reservoir

There are no visible signs of landslides or instability of the slopes along the reservoir area. No sedimentation problems were reported.

f. Spillway

In general, the spillway is in poor condition. The spillway walls were cracked at both abutments and at the construction joints.

Considerable debris was found in the tailrace channel and at the end of the spillway chute. Vegetation was growing through the expansion joints of the spillway slabs. No energy dissipation was provided at the end of the spillway.

The approach channel was not visible due to the presence of 3.0 feet high flashboards. A chain and log system was observed at the upstream end of the spillway to prevent ice from damaging the flashboards.

g. Downstream Channel

The downstream channel is highly vegetated and should be cleaned to permit the unimpeded flow of water. Below the property line the flow is dissipated into a wide swampy area which is the current headwaters of a branch of the Onesquethaw Creek. Two homes are located in this area. North of the dike the number of homes is approximately 10.

h. Regulating Outlets

The low level outlets and water intake system is in good condition and all valves except the low level outlet at the dam was reported operational.

3.2 EVALUATION OF OBSERVATIONS

Although some problems were observed, particularly from a maintenance standpoint, the Phase I inspection did not reveal any visual condition which would significantly affect the safety of the dam or would require an investigation program. Deficiencies described above require regular observation as well as prompt maintenance and improvement work. Remedial measures are described in section 7 "Assessment/Recommendations".

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 **PROCEDURE**

There is no minimum required water release at Vly Creek Dam or Dike and none is released. However, water can be released over the spillway or through a 3 feet outlet pipe under the dam and a $3\frac{1}{2}$ feet outlet pipe under the dike. Flow through the pipes is regulated by sluice gates with controls on the water side of the dam and dike. Water can be drawn for the treatment plant by any of the 3 - 2 feet diameter steel pipes located at elevations 365, 375 and 385, but an average of 6.2 cfs is usually drawn through the middle pipe. Water from the pipe passes through a screen to a tank that is connected to the treatment plant through another 24" pipe (El. 361). An 8 inch pipe can drain the tank for maintenance purposes. All the five pipes are fitted with gate valves with regulators at the control tower located on the upstream side of the dike.

4.2 **MAINTENANCE OF DAM AND DIKE**

The reservoir is frequently visited by the operational personnel who do not necessarily examine the dam, dike or other project features. There is no formally established program of inspections and there is no operation and maintenance manual for the project.

The toe of the dike is visible but brush and growth of vegetation is gradually encroaching on the area. The grass slope protection of the dam and dike is mowed two to three times a year and seems adequate. There is extensive growth of algee on the spillway. The chute and tailrace channel is full of algee, brush, small trees and debris. No regular maintenance procedures are established for the project, although some minor repair is done occassionally.

4.3 **MAINTENANCE OF OPERATIONAL FACILITIES**

All the gate valves except the low level outlet under the dam is operational. This gate valve has not been operated for years and it is not known whether it is in working condition. All the information about gate valves were relayed verbally at the site by operating personnel. There is no periodic inspection of operating facilities and there is no regular program of repairs.

4.4 **WARNING SYSTEMS IN EFFECT**

There is no warning system in effect or in preparation.

4.5 **EVALUATION**

The maintenance of the Vly Creek Dam and Dike is considered less than adequate in the following areas:

a. Control of algee, brush and saplings on the dam, chute and tailrace channel.

b. Non operation of gate valve of the 3 feet diameter low level outlet under the dam.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

The water of the Vly Creek Reservoir is contained by a dam with a spillway in the south and by a dike in the north. The dam is on Onesquethaw Creek that flows into Coeymens Creek and is located at 1.3 miles northeast of Clarksville. The Dike is on Vly Creek, a tributary of Normanskill, and is situated at 0.8 miles southeast of New Salem. The total drainage area is 2.52 square miles.

5.2 ANALYSIS CRITERIA

The only hydrologic data available for the dam and the dike are stage-discharge curves. For the purpose of this investigation, the dam (with the spillway) and the dike were analyzed with respect to their flood control potential. This potential was assessed through the development of Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the PMF through the reservoir.

The unit hydrograph was defined by the Snyder Coefficients, Tp and Cp. The Probable Maximum Precipitation (PMP) was 19.5 inches (Figure 1, Hydrometeorological Report (HMR) #33) for a 24 hour duration, 200 square mile basin. The percentages of the PMP applied to other duration storms were interpolated from the plot of drainage area versus percent of the 24 hour, 200 square mile depth (Figure 2, HMR #33). The PMF inflow hydrograph was determined by applying the PMP to the unit hydrograph for the basin and the peak inflow was 4,600 cfs. The hand computations were checked by computer using HEC-1 and the peak inflow was 4,800 cfs. After routing the peak inflow (4,800 cfs) through the impounded storage, the peak outflow was determined to be 2,400 cfs.

5.3 SPILLWAY CAPACITY

The uncontrolled spillway is 49 feet 9 inches in width, and composed of an ogee section and a chute section. The maximum head possible between the crest of the ogee and the top of dam is 7 feet. The design indicates no flashboards but 2 feet high flashboards were installed on top of the ogee in 1962 and later raised to 3 feet in 1966 reducing the maximum head possible to 4 feet. No data was available on the discharge rating of the spillway, so that the weir coefficient was given assumed values ranging from 3.28 to 3.47 depending upon discharge head and type of spillway. The computed capacities at the maximum head (top of dam) are 3,200 cfs without flashboards and 1350 cfs with flashboards.

5.4 RESERVOIR CAPACITY

The length of the reservoir is 2.1 miles and the length of the shoreline is approximately 4.8 miles at spillway crest. The reservoir capacities at spillway crest, top of flashboards and top of dam are 3,100 3,600 and 4,500 acre-feet respectively. The storage capacity curve is shown in Appendix E. The curve indicates a surcharge storage above spillway crest of 1,400 acre-feet which is equivalent to a runoff depth of 10.4 inches over the drainage area.

5.5 FLOODS OF RECORD

The higest and lowest water levels recorded since completion of Vly Creek Dam and Dike in 1957 are as follows:

	Date	Elev. (feet)	Discharge (cfs)
Higest	Spring of several past years	393.25	20
Lowest	February 1966	377.9	—

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillway is 3,200 cfs, but the capacity has been reduced to 1,350 cfs as a result of installation of 3 feet high flashboards on top of the spillway. The spillway is capable of handling the PMF peak outflow of 2,400 cfs without being overtopped. However, the spillway is inadequate to pass the PMF with the installed flashboards.

5.7 EVALUATION

The spillway is adequate to pass the PMF. Flashboards with spring mechanism that fail under a certain head should be installed if storage above the spillway crest is desired.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations did not indicate any significant signs of distress in either the dam or dike. There was minor settlement of the crest of the dike but no visual distoration of the horizontal alignment. No detrimental affects could be discerned from this settlement. The condition of the spillway noted in Section 3: Visual Inspection will have no detrimental affect on the structural stability of the dam.

b. Design and Construction Data

The original design computations which were prepared by Benjamin L. Smith & Associates in 1954 and 1955 were obtained for review. There were no stability analyses found for the earth embankment sections of the dike and dam and it is assumed that none were completed.

There were extensive analyses performed on the concrete spillway section of the dam. The computations included analyses using both 10,000 lb per ft. and 15,000 lb per ft. ice loadings. The 10,000 lb per ft. loading is a more reasonable value for the location of the dam so the following results are based on that loading. The original design computations indicated a safety factor against sliding of 1.89. A mathematical error was found in the calculations and the corrected analysis produced a safety factor of 5.75.

Additional analyses, performed for the purposes of this report, using more conservative soil parameters, produced a safety factor of 3.56. These analyses are included in Appendix A with selected computations prepared by the designer, Benjamin L. Smith & Associates. The safety factor against sliding of the concrete spillway is in excess of 3.0 which complies with the Corps of Engineers Guidelines.

Overturning was analized for three different cases of loading. The results of the investigations follow:

1. CASE #1 - Empty Reservoir - Resultant is located within middle third of all sections of the spillway.

2. CASE #2 - Reservoir at elevation 386.5 10,000 lb per ft. ice load at elevation 386, uplift and weight of dam. Resultant is located within middle third of all sections of the spillway.

3. CASE #3 - Reservoir at elevation 397 (embankment crest elevation), uplift and weight of dam. Resultant is located at downstream limit of middle third section of base. Resultant is located downstream from middle third for upper sections of the dam.

In Case #2, the ice loading was applied at elevation 386 instead of at elevation 390 which is the spillway crest elevation. The computations included an assumption that ice could not act above elevation 386 because of the inclined face of the spillway above that point. The reservoir at elevation 386.5 and ice at elevation 386 were, therefore, assumed to be critical for Case #2. This appears to be a reasonable assumption because any ice above elevation 386 would tend to slide up over the top of the spillway, breakup, and not exert as great a force.

The analysis used in Case #3 was conservative for the following reasons:

1. The weight of the concrete cut-off wall at the upstream face of the spillway was not included in the weight of the dam. The weight of the wall would increase the stability of the spillway unless the concrete cracked and the cut-off wall separated from the spillway section.

2. The uplift force was computed using 100% of reservoir head at the upstream end of the section and zero water pressure at the downstream end. The reinforced concrete apron and the cut-off wall would reduce the uplift pressures under the spillway. These reductions would occur unless the apron or the cut-off wall became cracked. Additional soil investigations and construction of a flow net are required to compute more accurate uplift pressure under the base of the spillway.

3. The uplift forces in the upper portions of concrete spillway would not develope unless the concrete became severely cracked.

The overall concrete spillway section is considered safe against overturning because the resultant of forces is located within the middle third of the base. However, upper portions of the spillway will become unstable under extensive high reservoir levels if the spillway has horizontal cracks through it.

The only information available on construction are the photos taken during construction which are included in Apprndix B.

c. Operating Records

No operational problems which would affect the stability of the dam were reported or recorded by the water district personnel.

d. Post-Construction Changes

Flashboards 2 feet in height were installed in 1962, and in 1966 the height of flashboards was increased to the current height of 3 feet.

Additional riprap was placed on the upstream face at the east abutment of the dam in the late 1950's to prevent erosion and scour of the embankment.

e. Seismic Stability

The dam and dike are located near the boundary between seismic zones No. 1 and 2. Seismic stability analyses could not be located so we assume none were done. However, since the dam and dike appear to be stable and the seismic coefficients are small, seismic stability analysis are not warranted.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Vly Creek Dam and Dike did not reveal any visual conditions which would constitute a hazard to human life or property. The earth embankments and spillway are considered stable. The capacity of the spillway is adequate to pass the PMF but is inadequate with the installed flashboards. However, the spillway can handle Standard Project Flood which is usually half of PMF with or without the flashboards on top of the spillway.

b. Adequacy of Information

Information reviewed for the purposes of the Phase I Inspection report is considered adequate.

c. Need for Additional Investigations

No additional investigation is required.

7.2 RECOMMENDED MEASURES

a. Flashboards with spring mechanism that fail under a certain head should be installed if storage above the spillway crest is desired.

The following improvements can be accomplished by the maintenance forces:

b. All debris in the spillway chute and the tailrace channel must be removed. All vegetative growth in the channel must be removed and periodically maintained in that manner. Vegetation below the toe of the embankments should also be regularly trimmed back to permit unimpeded inspection of this area. Additional growth observed in the riprap should be removed.

c. Riprap should be placed in the tailrace channel after debris removal to prevent scour and undermining of the spillway.

d. All joints in the spillway must be cleaned and recaulked. All concrete cracks must be cleaned and repaired, with particular attention paid to sealing of horizontal cracks and joints.

e. The gate operating structure and appurtenant valves must be periodically and systematically inspected and repaired, including annual operation of all low level outlet valves.

f. An adequate regulation plan and warning system should be developed for use in the event of a threatened failure.

DRAWINGS

APPENDIX A

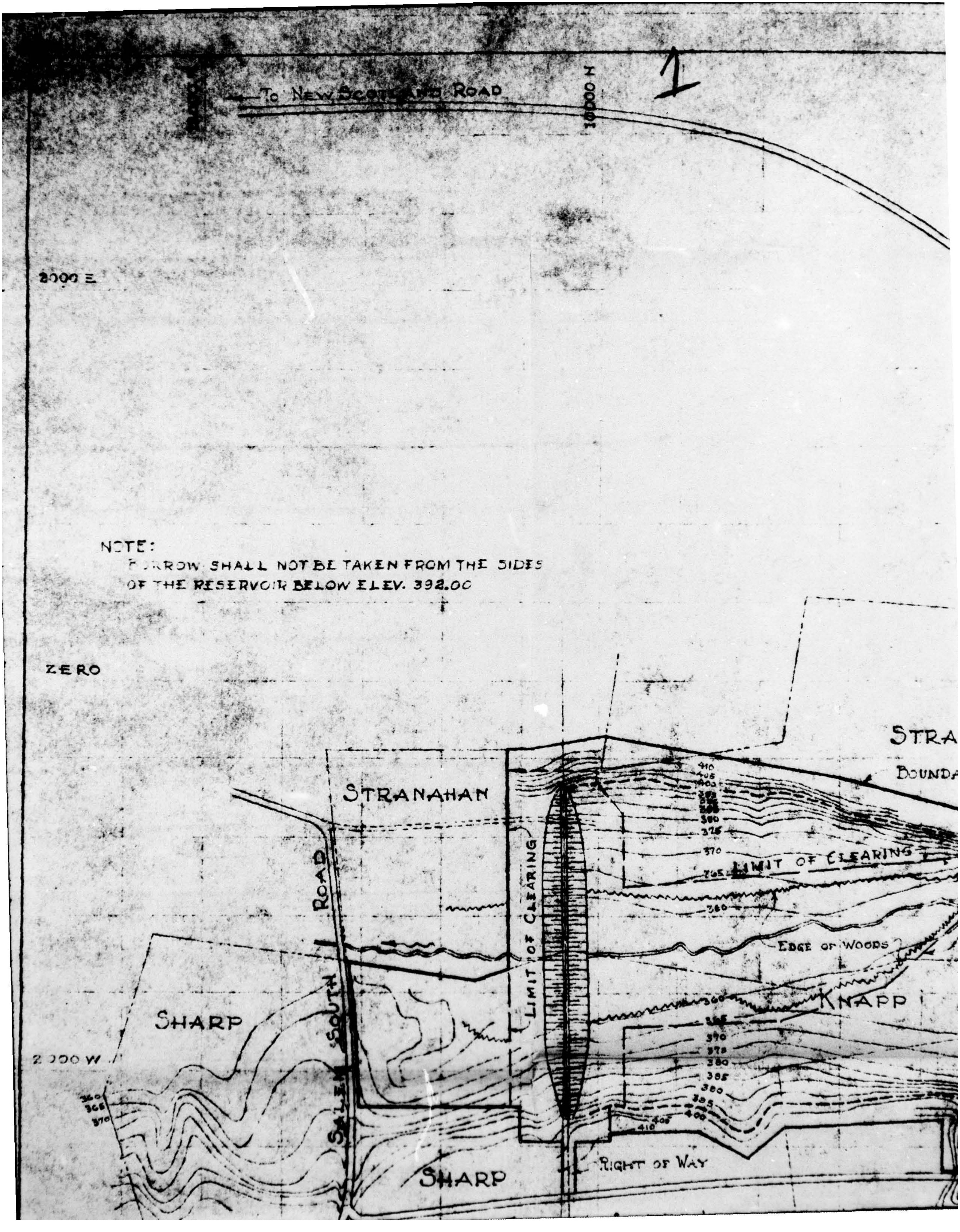
VICINITY MAP
VLY CREEK DAM

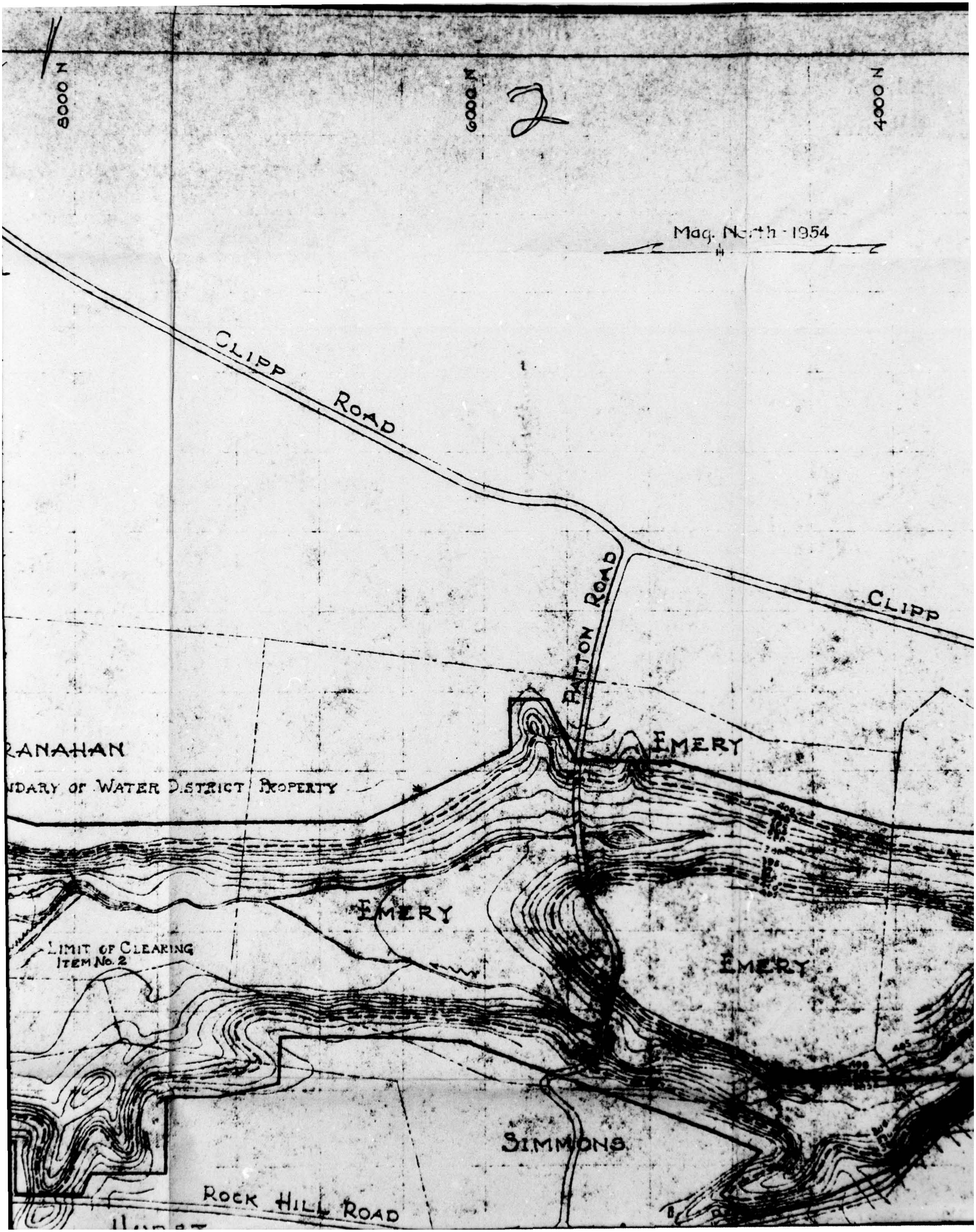
TOPOGRAPHIC MAP
VLY CREEK DAM

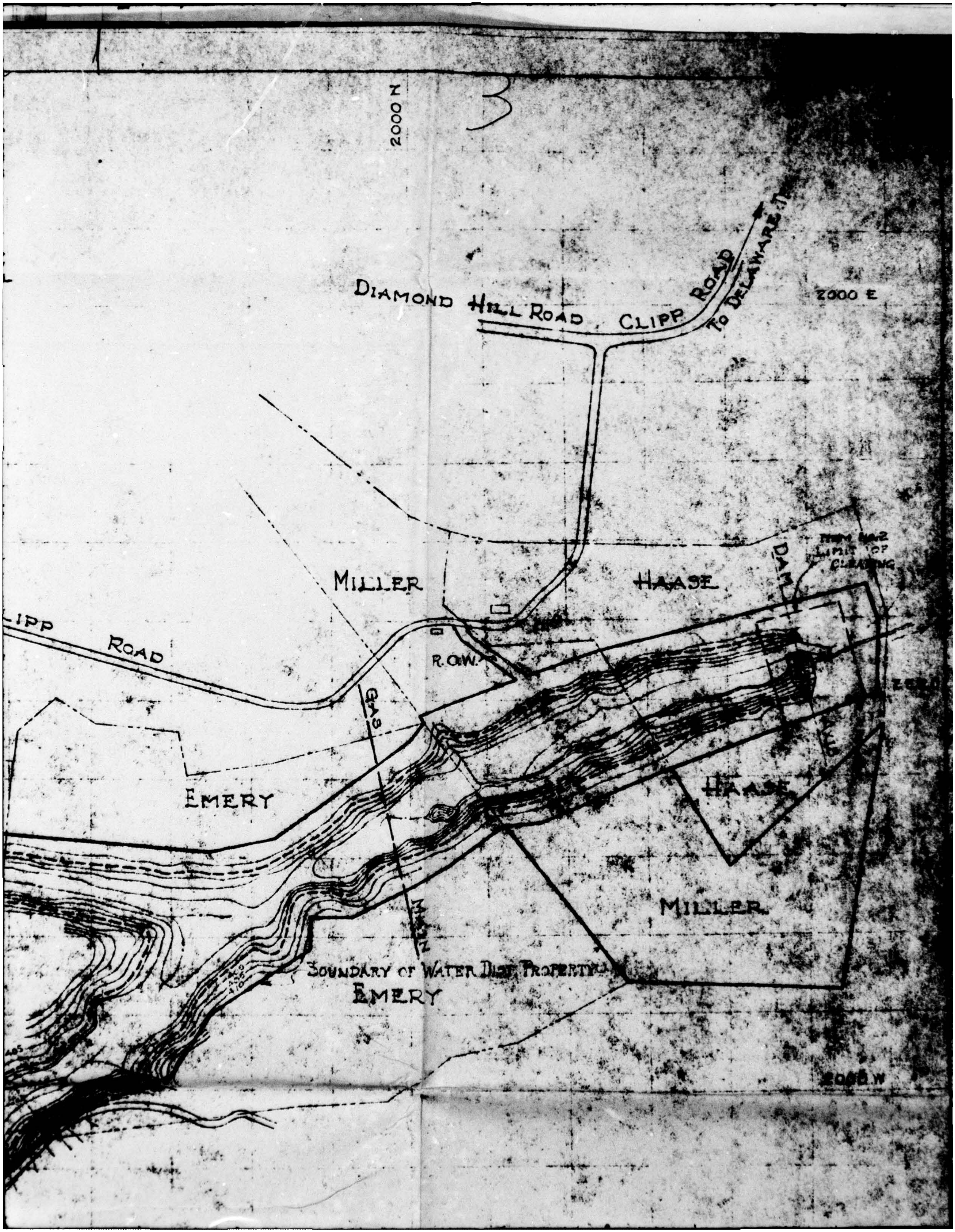
APPENDIX A

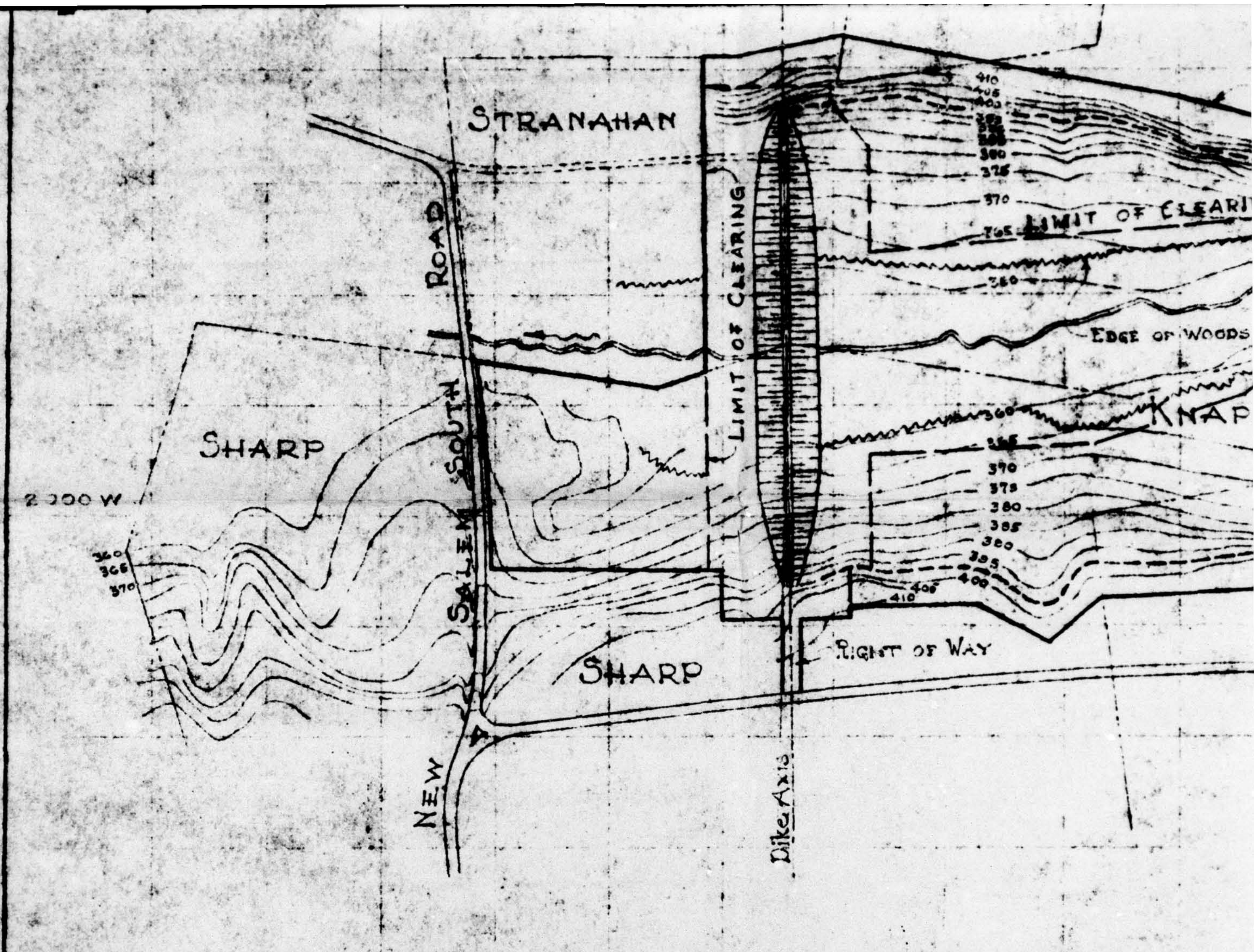
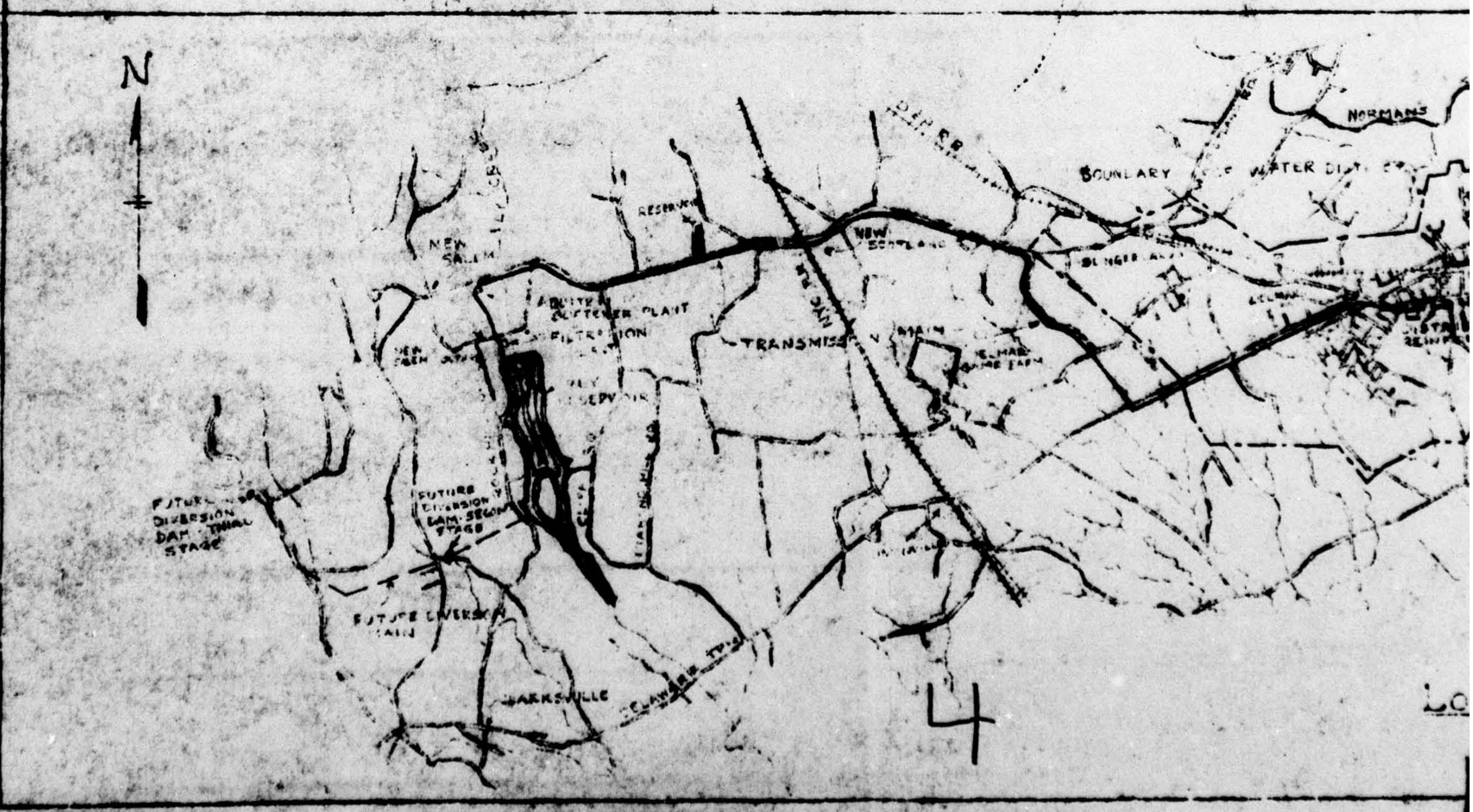
List of Drawings Included for the Phase I Investigation of Vly Creek Dam

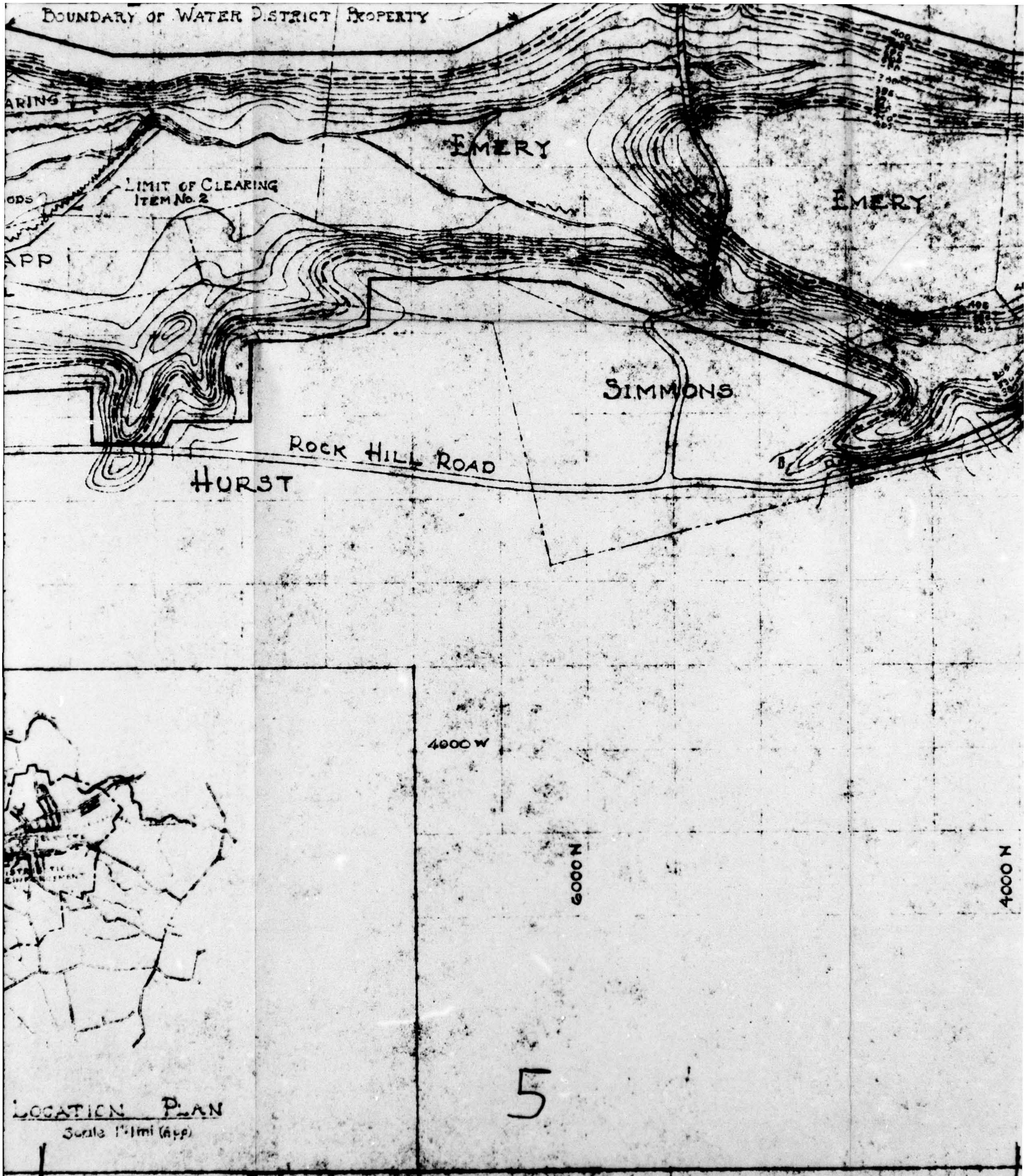
Drawings	Drawing No.
General Plan	1 of 10
Test Borings	2 of 10
Test Borings	3 of 10
Dike, General Plan	4 of 10
Dike, Profile of Core & Cut-Off Walls	5 of 10
Dike, Intake Structures & Gate House	6 of 10
Dam, General Plan	7 of 10
Dam, Profile of Core & Cut-Off Walls	8 of 10
Dam, Spillway Section & Abutment Walls	9 of 10
Reservoir Drain Wells	10 of 10

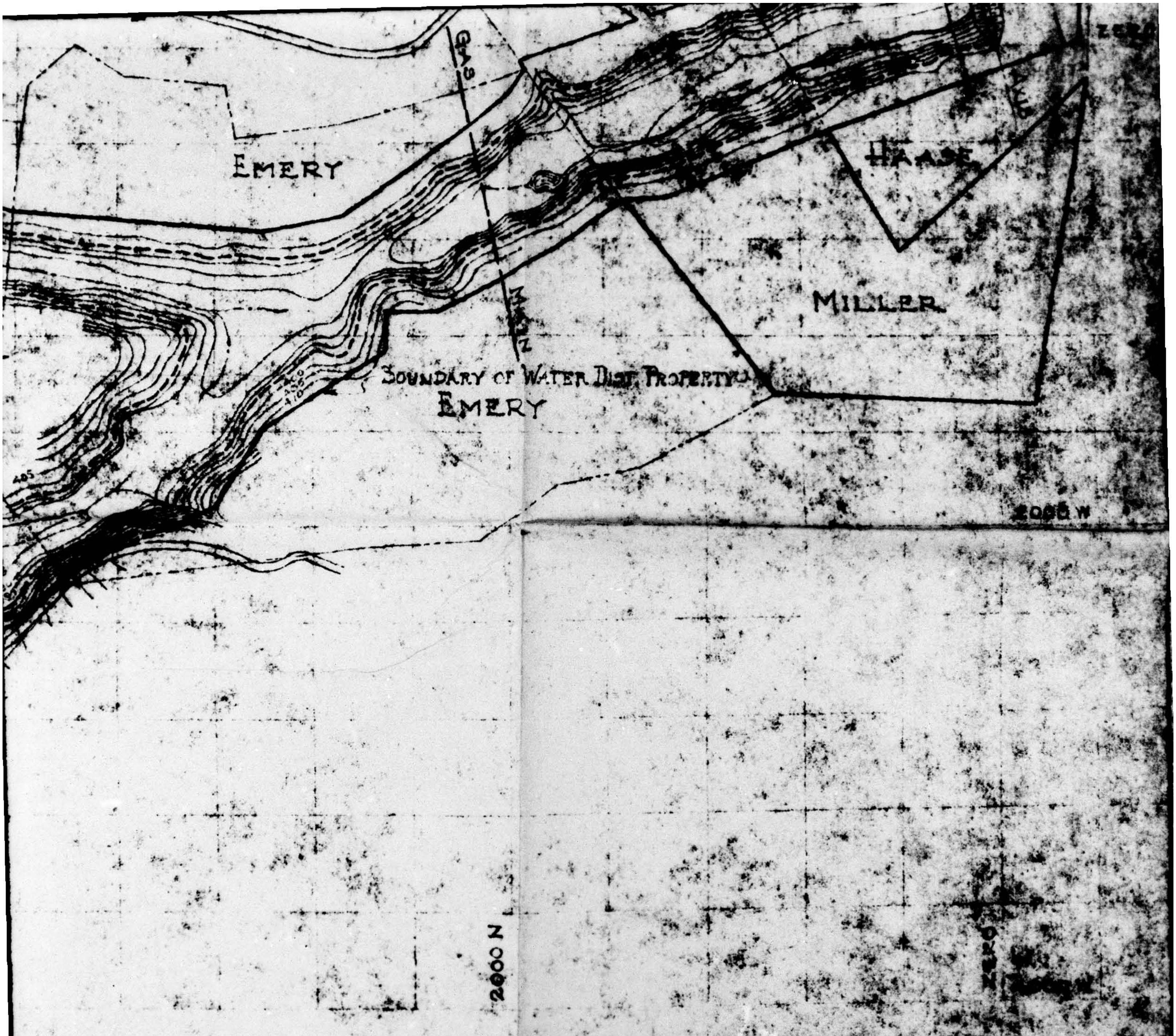

1
TO NEW SCOTLAND ROAD
10000 N
2000 E
NOTE:
BORROW SHALL NOT BE TAKEN FROM THE SIDES
OF THE RESERVOIR BELOW ELEV. 392.00
ZERO
STRANAHAN
SOUTH SALEM ROAD
LIMIT OF CLEARING
LIMIT OF CLEARING
EDGE OF WOODS
KNAPP
SHARP
2000 W
RIGHT OF WAY
SHARP


1
8000 N
6000 N
2
4000 N
Mag. North - 1954
CLIPP ROAD
PATTON ROAD
CLIPP
RANAHAN
EMERY
NDARY OF WATER DISTRICT PROPERTY
EMERY
EMERY
LIMIT OF CLEARING
ITEM No. 2
SIMMONS
ROCK HILL ROAD


3
2000 N
DIAMOND HILL ROAD
CLIPP ROAD
TO DELAWARE
2000 E
LIMIT OF CLEARING
DAM
MILLER
HAASE
CLIPP ROAD
R.O.W.
GAS MAIN
EMERY
HAASE
MILLER
BOUNDARY OF WATER DIST. PROPERTY
EMERY
2000 W


STRANAHAN
NEW SALEM SOUTH ROAD
LIMIT OF CLEARING
LIMIT OF CLEARING
EDGE OF WOODS
SHARP
SHARP
2000 W
RIGHT OF WAY
Dike Axis
410
405
400
380
375
370
365
360
385
395

N
NEW SALEM
NEW SCOTLAND
TRANSMISSION MAIN
FILTRATION
NORMANS
BOUNDARY
4


BOUNDARY OF WATER DISTRICT PROPERTY
EMERY
LIMIT OF CLEARING
ITEM No. 2
EMERY
SIMMONS
ROCK HILL ROAD
HURST
4000 W
6000 N
4000 N
LOCATION PLAN
Scale 1"=1mi (App)
5

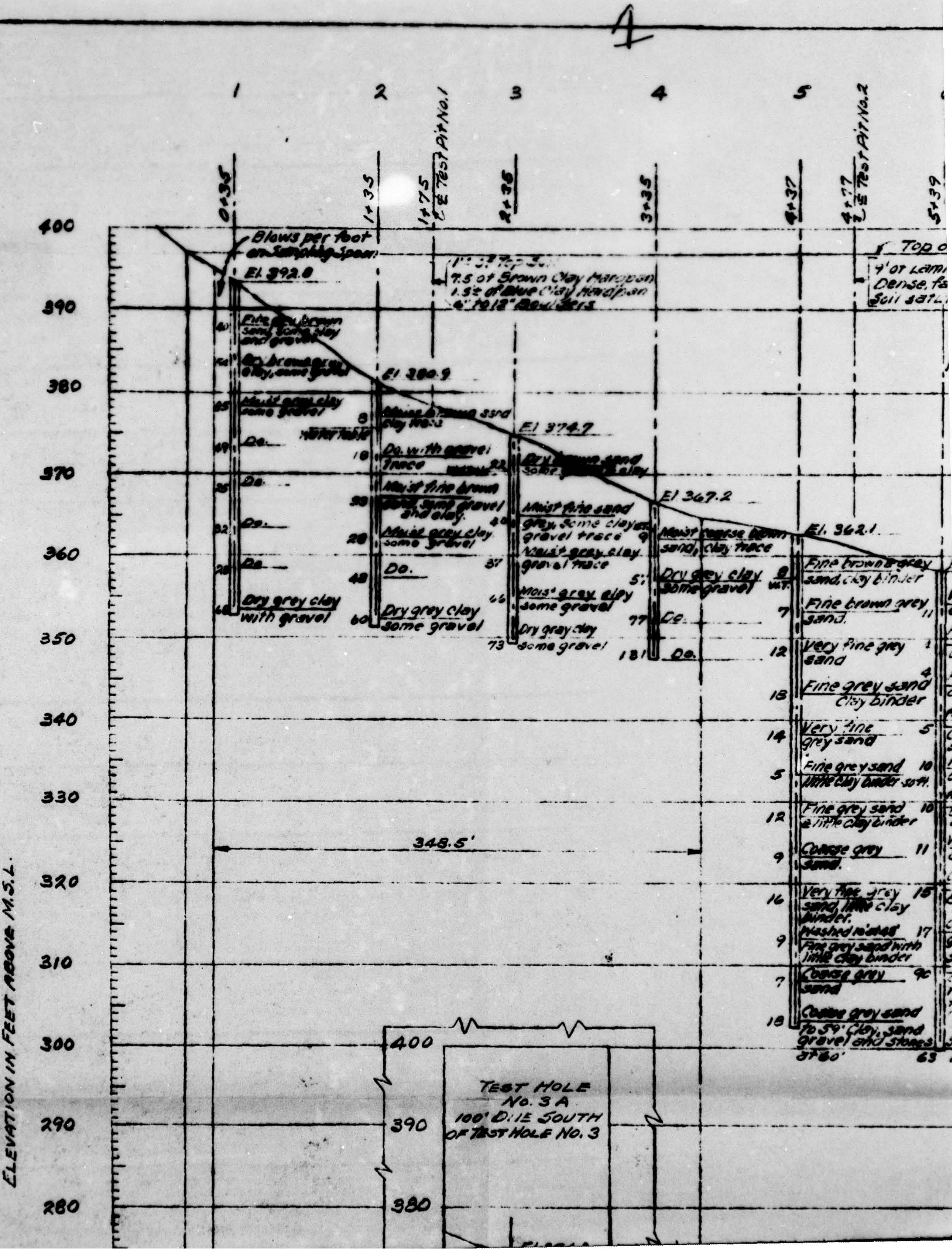


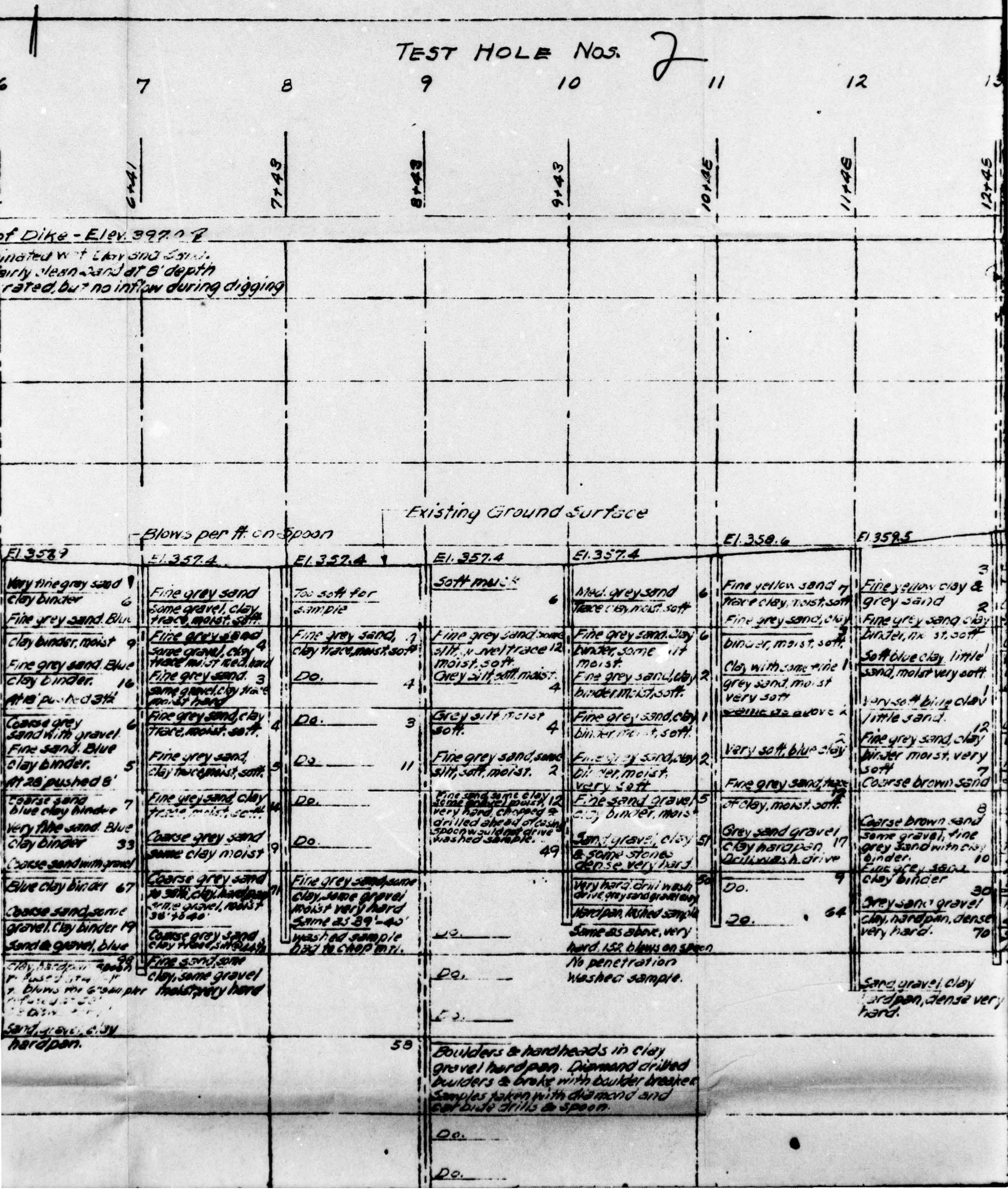
WATER DISTRICT No. 1
TOWN of BETHLEHEM, NEW YORK
IMPROVEMENTS TO WATER SUPPLY SYSTEM
CONTRACT. No. 4
VLY CREEK RESERVOIR
GENERAL PLAN

BENJAMIN L. SMITH & ASSOCIATES
CONSULTING ENGINEERS
SCALE: 1" = 400'

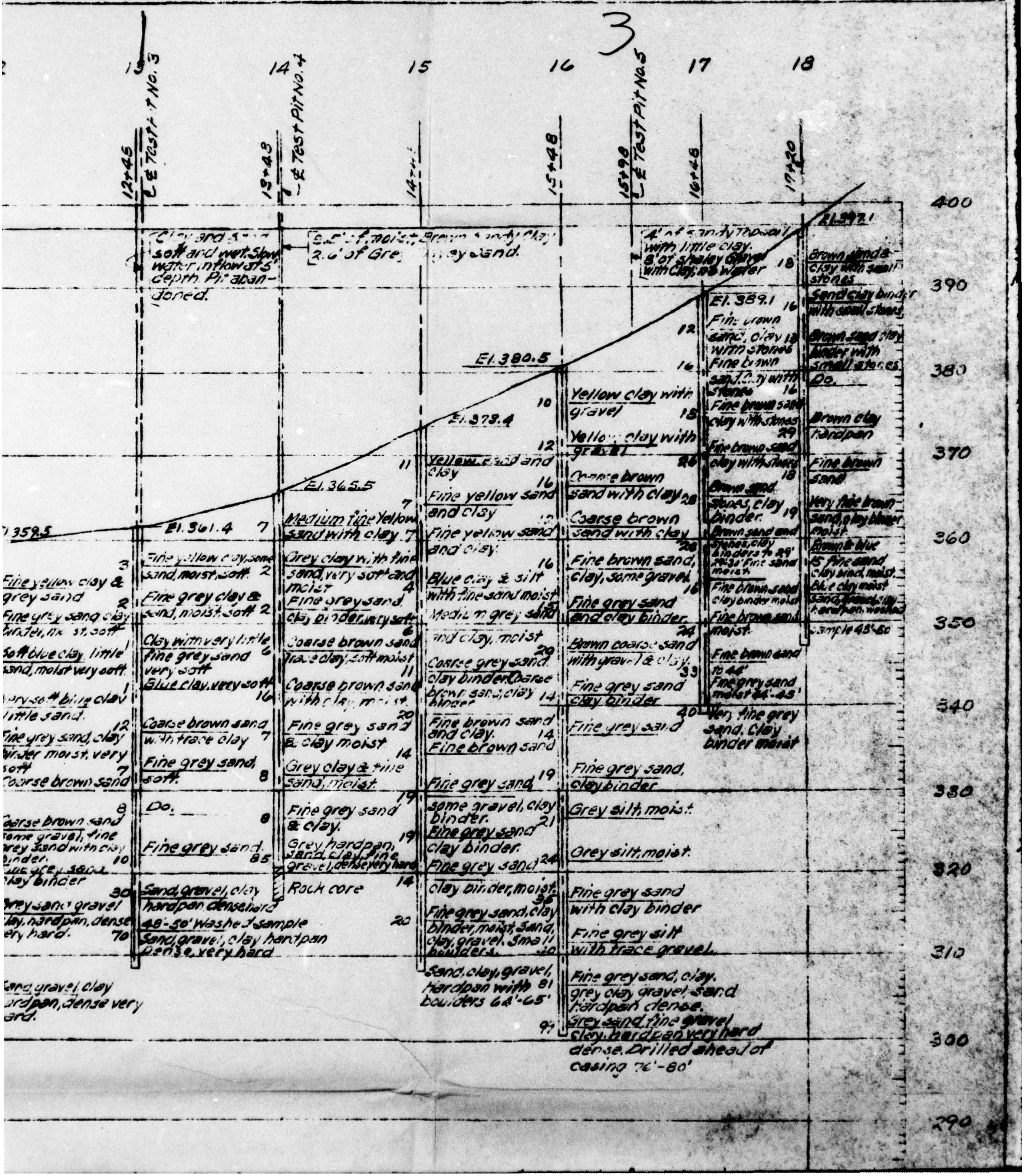
6

ALBANY, N.Y.
1955

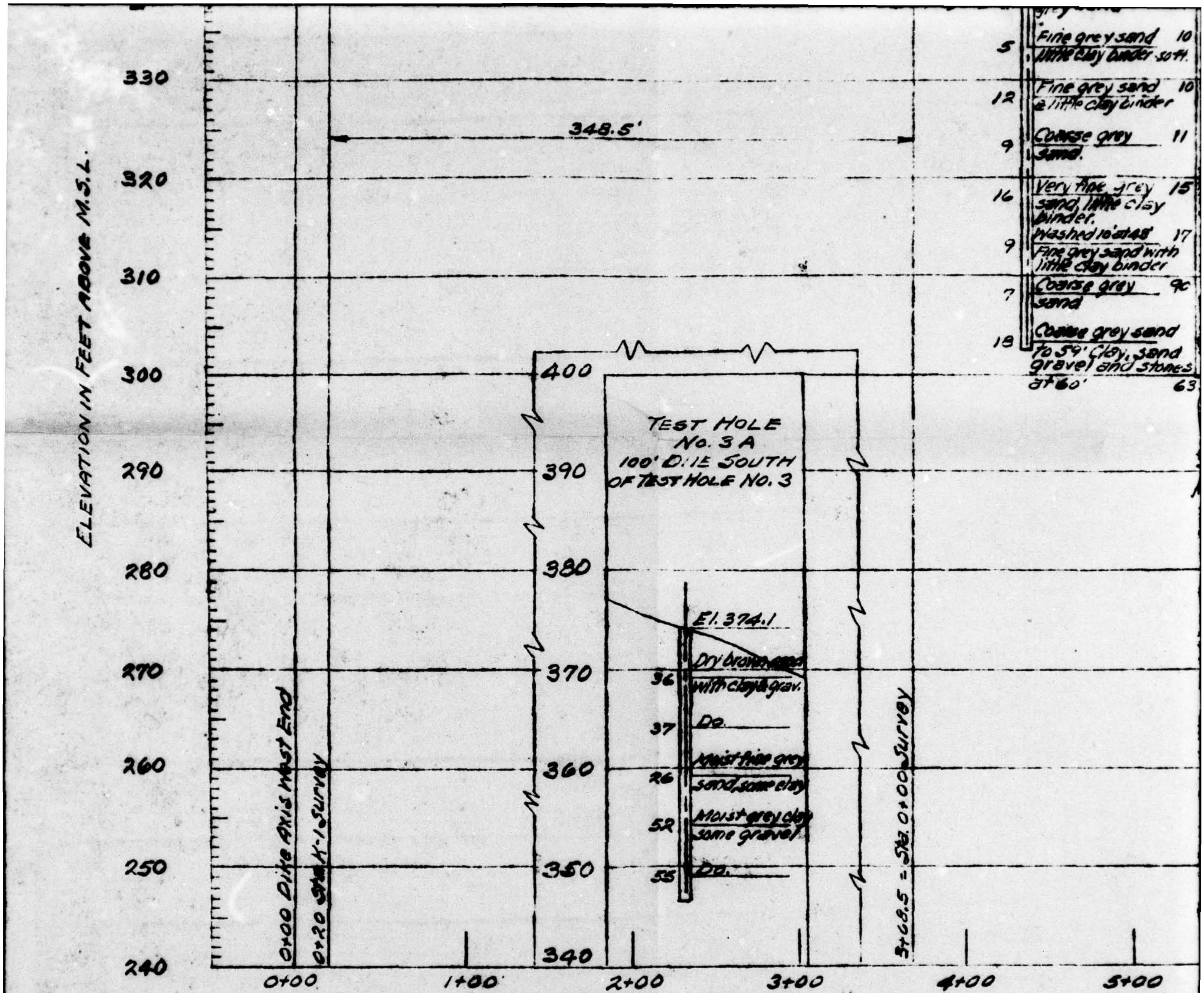

4
1
2
3
4
5
0+35
1+35
1+75 C.E. Test Pit No.1
2+36
3+35
4+37
4+77 C.E. Test Pit No.2
5+39
400
390
380
370
360
350
340
330
320
310
300
290
280
ELEVATION IN FEET ABOVE M.S.L.
Blows per foot on Sampling Spoon
El. 392.8
7.5 of Brown Clay Hardpan
1.5 of Blue Clay Hardpan
4" to 12" Boulders
Top o
4' of Lami
Dense, fa
Soil satu
Fine grey brown sand, some clay and gravel
Dry brown grey clay, some gravel
Moist grey clay some gravel
Do.
Dry grey clay with gravel
El. 380.9
Water table
Do. with gravel trace
Moist fine brown sand, some gravel and clay.
Moist grey clay some gravel
Dry grey clay some gravel
El. 374.7
Moist fine sand grey, some clay gravel trace
Moist grey clay gravel trace
Moist grey clay some gravel
Dry gray clay some gravel
El. 367.2
Moist coarse brown sand, clay trace
Dry grey clay some gravel
El. 362.1
Fine brown grey sand, clay binder
Fine brown grey sand.
Very fine grey sand
Fine grey sand Clay binder
Very fine grey sand
Fine grey sand little clay binder
Fine grey sand a little clay binder
Coarse grey sand.
Very fine grey sand, little clay binder.
Washed water
Fine grey sand with little clay binder
Coarse grey sand
Coarse grey sand to 59' Clay, sand gravel and stones at 60'
348.5'
TEST HOLE No. 3 A
100' DUE SOUTH OF TEST HOLE No. 3



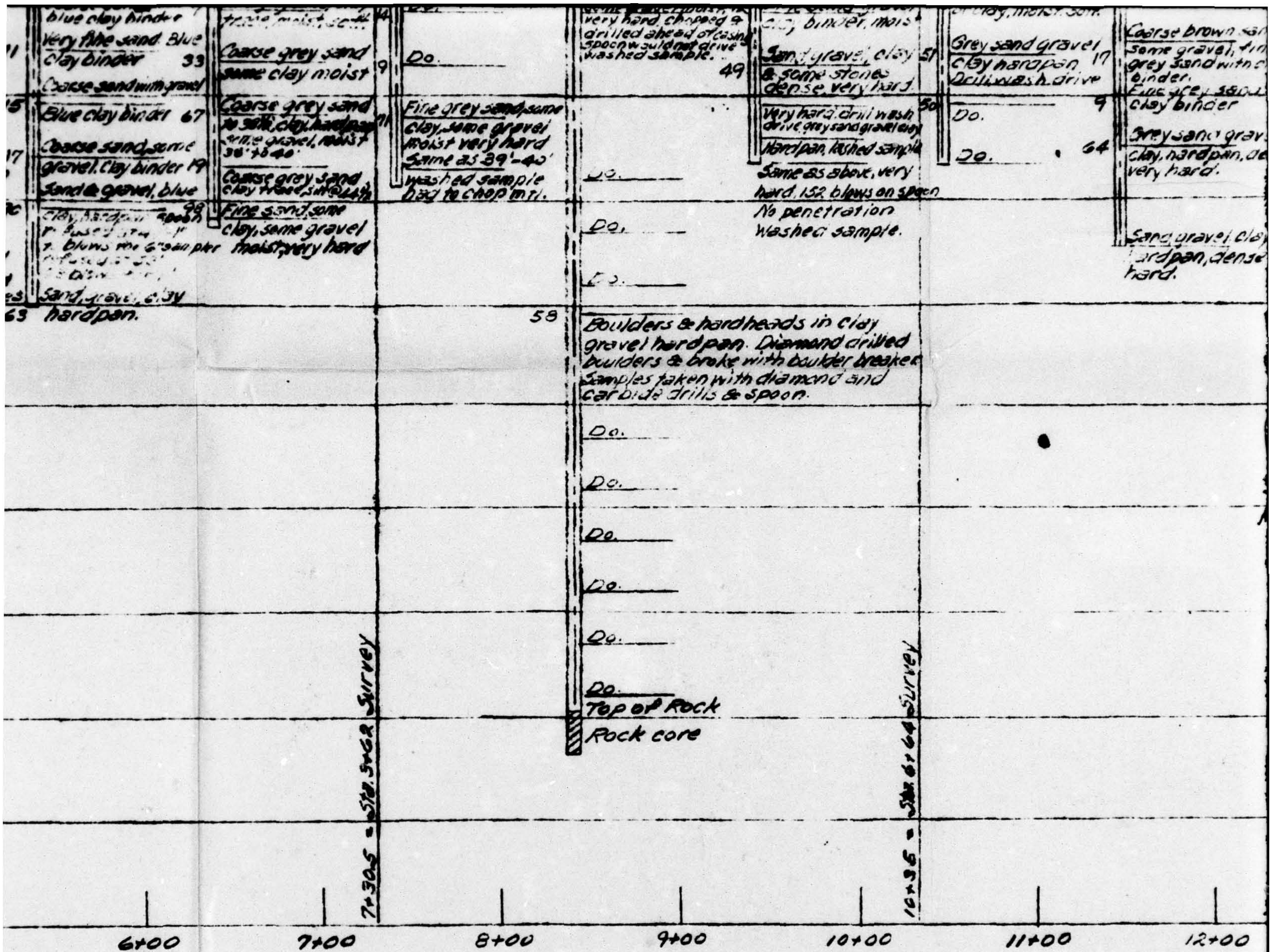
TEST HOLE NOS.
6
7
8
9
10
11
12
13
6+41
7+43
8+43
9+43
10+45
11+45
12+45
of Dike - Elev. 397.0
inated wet clay and sand.
airly clean sand at 8' depth
rated, but no inflow during digging
Existing Ground Surface
Blows per ft. on Spoon
El. 357.9
Very fine grey sand clay binder 6
Fine grey sand. Blue clay binder, moist 9
Fine grey sand. Blue clay binder. 16
At 18' pushed 3½'
Coarse grey sand with gravel. 6
Fine sand. Blue clay binder. 5
At 28' pushed 8'
Coarse sand blue clay binder 7
Very fine sand. Blue clay binder 33
Coarse sand with gravel
Blue clay binder 67
Coarse sand, some gravel. Clay binder 19
Sand & gravel, blue clay, hardpan
sand, gravel, clay hardpan.
El. 357.4
Fine grey sand some gravel, clay trace, moist, soft.
Fine grey sand some gravel, clay trace moist med. hard 4
Fine grey sand. some gravel, clay trace moist hard 3
Fine grey sand, clay trace, moist, soft. 4
Fine grey sand, clay trace, moist, soft. 5
Fine grey sand, clay trace, moist, soft 14
Coarse grey sand some clay moist 9
Coarse grey sand & silt, clay, hardpan some gravel, moist 38'-40'
Coarse grey sand clay trace, silt
Fine sand, some clay, some gravel moist, very hard
El. 357.4
Too soft for sample
Fine grey sand, clay trace, moist, soft 7
Do. 4
Do. 3
Do. 11
Do.
Do.
Fine grey sand, some clay, some gravel moist very hard
Same as 39'-40' washed sample had to chop m'tl.
El. 357.4
Soft muck 6
Fine grey sand some silt, gravel trace moist, soft. 12
Grey silt, soft, moist. 4
Grey silt moist soft. 4
Fine grey sand, sand silt, soft, moist. 2
Fine sand some clay some gravel moist, very hard, chopped & drilled ahead of casing spoon would not drive washed sample. 12
49
Do.
Do.
Do.
58
Boulders & hardheads in clay gravel hardpan. Diamond drilled boulders & broke with boulder breaker. Samples taken with diamond and carbide drills & spoon.
Do.
Do.
El. 357.4
Med. grey sand Trace clay, moist, soft 6
Fine grey sand, clay binder, some silt moist. 6
Fine grey sand, clay binder, moist, soft. 2
Fine grey sand, clay binder, moist, soft. 1
Fine grey sand, clay binder, moist. very soft 2
Fine sand gravel clay binder, moist 5
Sand, gravel, clay & some stones dense, very hard. 51
Very hard. Drill wash drive, grey sand gravel clay hardpan, lashed sample 50
Same as above, very hard. 152 blows on spoon
No penetration washed sample.
El. 358.6
Fine yellow sand trace clay, moist, soft 7
Fine grey sand, clay binder, moist, soft. 3
Clay, with some fine grey sand, moist very soft 1
Same as above 2
Very soft blue clay 2
Fine grey sand, trace of clay, moist. soft. 11
Grey sand gravel clay hardpan Drill wash drive 17
Do. 9
Do. 64
El. 359.5
Fine yellow clay & grey sand 3
Fine grey sand clay binder, moist, soft 2
Soft blue clay little sand, moist very soft 1
Very soft blue clay little sand. 1
Fine grey sand, clay binder moist, very soft 12
Coarse brown sand 7
Coarse brown sand some gravel, fine grey sand with clay binder. 8
Fine grey sand clay binder 10
Grey sand gravel clay, hardpan, dense very hard. 30
70
Sand, gravel, clay hardpan, dense very hard.



3
13
14
15
16
17
18
12+45
℄ Test Pit No. 3
13+43
℄ Test Pit No. 4
14+4
15+48
15+98
℄ Test Pit No. 5
16+46
17+20
400
390
380
370
360
350
340
330
320
310
300
290
Clay and sand soft and wet. Slow water inflow at 5' depth. Pit abandoned.
2.5' of moist Brown sandy clay
2.6' of Grey clay sand.
4' of sandy topsoil with little clay.
8' of shaley Gravel with Clay, no water
El. 397.1
El. 389.1
El. 380.5
El. 373.4
El. 365.5
El. 361.4
El. 359.5
Fine yellow clay & grey sand
Fine grey sand clay binder, moist, soft
Soft blue clay, little sand, moist very soft.
Very soft blue clay little sand.
Fine grey sand, clay binder moist, very soft
Coarse brown sand
Coarse brown sand some gravel, fine grey sand with clay binder.
Fine grey sand clay binder
Grey sand gravel clay, hardpan, dense very hard.
Sand gravel, clay hardpan, dense very hard.
Fine yellow clay, some sand, moist, soft.
Fine grey clay & sand, moist, soft
Clay with very little fine grey sand very soft
Blue clay, very soft
Coarse brown sand with trace clay
Fine grey sand, soft.
Do.
Fine grey sand.
Sand, gravel, clay hardpan dense hard
48'-50' Washed sample
Sand, gravel, clay hardpan dense, very hard
Medium fine Yellow sand with clay.
Grey clay with fine sand, very soft and moist
Fine grey sand clay binder, very soft
Coarse brown sand trace clay, soft moist
Coarse brown sand with clay, moist.
Fine grey sand & clay moist
Grey clay & fine sand, moist.
Fine grey sand & clay.
Grey hardpan, sand, clay, fine gravel, dense very hard
Rock core
Yellow sand and clay
Fine yellow sand and clay
Fine yellow sand and clay.
Blue clay & silt with fine sand moist
Medium grey sand and clay, moist
Coarse grey sand, clay binder. Coarse brown sand, clay binder
Fine brown sand and clay.
Fine brown sand
Fine grey sand
some gravel, clay binder.
Fine grey sand clay binder.
Fine grey sand
clay binder, moist.
Fine grey sand, clay binder, moist, Sand, clay, gravel. Small boulders.
Sand, clay, gravel, hardpan with boulders 62'-65'
Yellow clay with gravel
Yellow clay with gravel
Coarse brown sand with clay
Coarse brown sand with clay
Fine brown sand, clay, some gravel
Fine grey sand and clay binder.
Brown coarse sand with gravel & clay.
Fine grey sand clay binder
Fine grey sand
Fine grey sand, clay binder
Grey silt, moist.
Grey silt, moist.
Fine grey sand with clay binder
Fine grey silt with trace gravel.
Fine grey sand, clay. grey clay gravel, sand hardpan dense.
Grey sand, fine gravel clay, hardpan very hard dense. Drilled ahead of casing 76'-80'
Fine brown sand, clay with stones
Fine brown sand, clay with stones
Fine brown sand clay with stones
Fine brown sand clay with stones
Brown sand. Stones, clay binder.
Brown sand and stones, clay binders to 29'
Fine brown sand clay binder moist
Fine brown sand moist.
Fine brown sand to 44'
Fine grey sand moist 44'-45'
Very fine grey sand, clay binder moist
Brown sand & clay with small stones
Sand clay binder with small stones.
Brown sand clay binder with small stones.
Do.
Brown clay hardpan
Fine brown sand
Very fine brown sand, clay binder moist.
Brown & blue fine sand clay binder, moist.
Blue clay moist
Sand, gravel, clay hardpan, washed sample 48'-50'



ELEVATION IN FEET ABOVE M.S.L.
330
320
310
300
290
280
270
260
250
240
348.5'
Fine grey sand 10
little clay binder soft.
5
Fine grey sand 10
a little clay binder
12
Coarse grey 11
sand.
9
Very fine grey 15
sand, little clay
binder.
16
Washed 10' at 48' 17
Fine grey sand with
little clay binder
9
Coarse grey 9C
sand
7
Coarse grey sand
to 59' Clay, sand
gravel and stones
at 60' 63
18
400
390
380
370
360
350
340
TEST HOLE
No. 3 A
100' DIKE SOUTH
OF TEST HOLE No. 3
El. 374.1
Dry brown sand
with clay & grav.
36
Do.
37
Moist fine grey
sand, some clay
26
Moist grey clay
some gravel.
52
Do.
55
0+00 Dike Axis West End
0+20 Sta. K-1 Survey
3+68.5 = Sta. 0+00 Survey
0+00
1+00
2+00
3+00
4+00
5+00



PROFILE ALONG AXIS OF DIKE LOOKING NORTHERLY

Scales: 1" = 60' Horiz.
1" = 10' Vert.

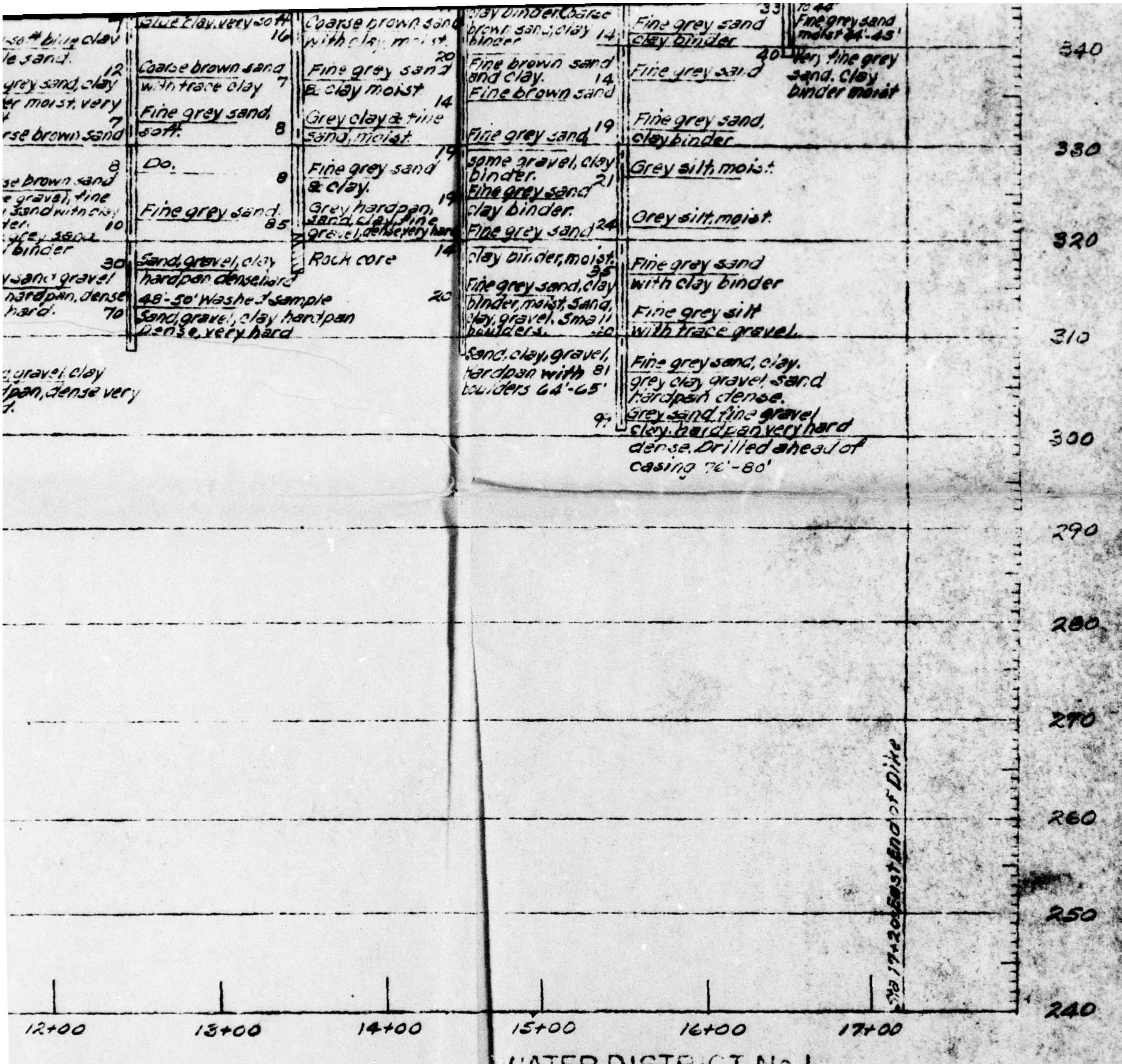
NOTES:-

Log of Test Borings Transcribed from records of Hall & Co. Inc. Albany, N.Y.

Weight of Hammer	: 300 lbs.	except at T.H. No. 7 where 140 lb. Hammer and 30" Fall were
Distance of Fall	: 18 ins.	
Size of Casing	: 2½ in. Extra Heavy	
Diameter of Sample	: 1⅜ in.	

Numbers Indicate Blows per Foot on Sampling Spoon

Borings made during April & May 1955.



Fall were used

WATER DISTRICT No. I

TOWN OF BETHLEHEM, NEW YORK

IMPROVEMENTS TO WATER SUPPLY SYSTEM

CONTRACT No. 4

VLY RESERVOIR DIKE

TEST BORINGS

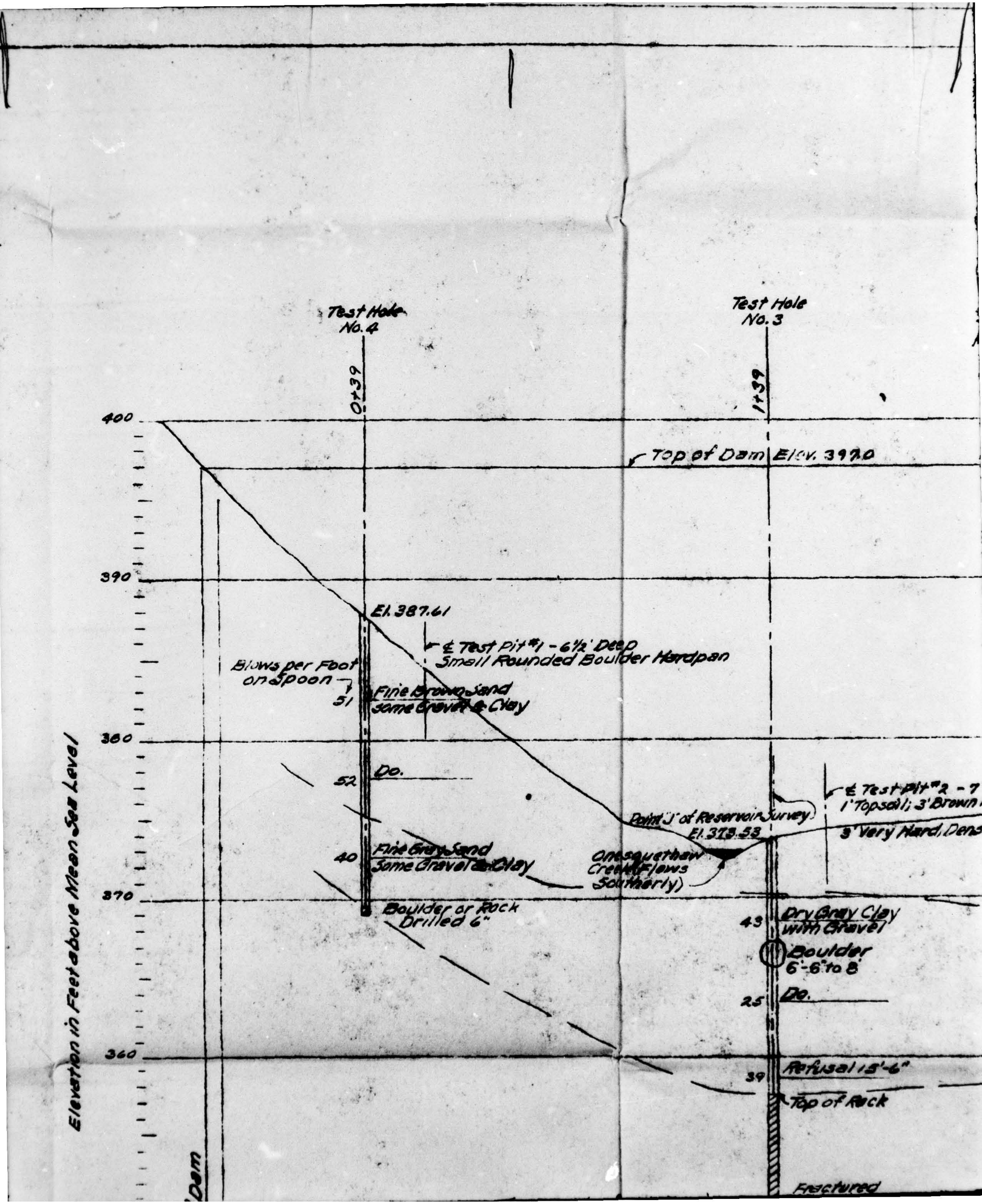
BENJAMIN L. SMITH & ASSOCIATES — ALBANY, N.Y.

CONSULTING ENGINEERS — SEPT. 1955

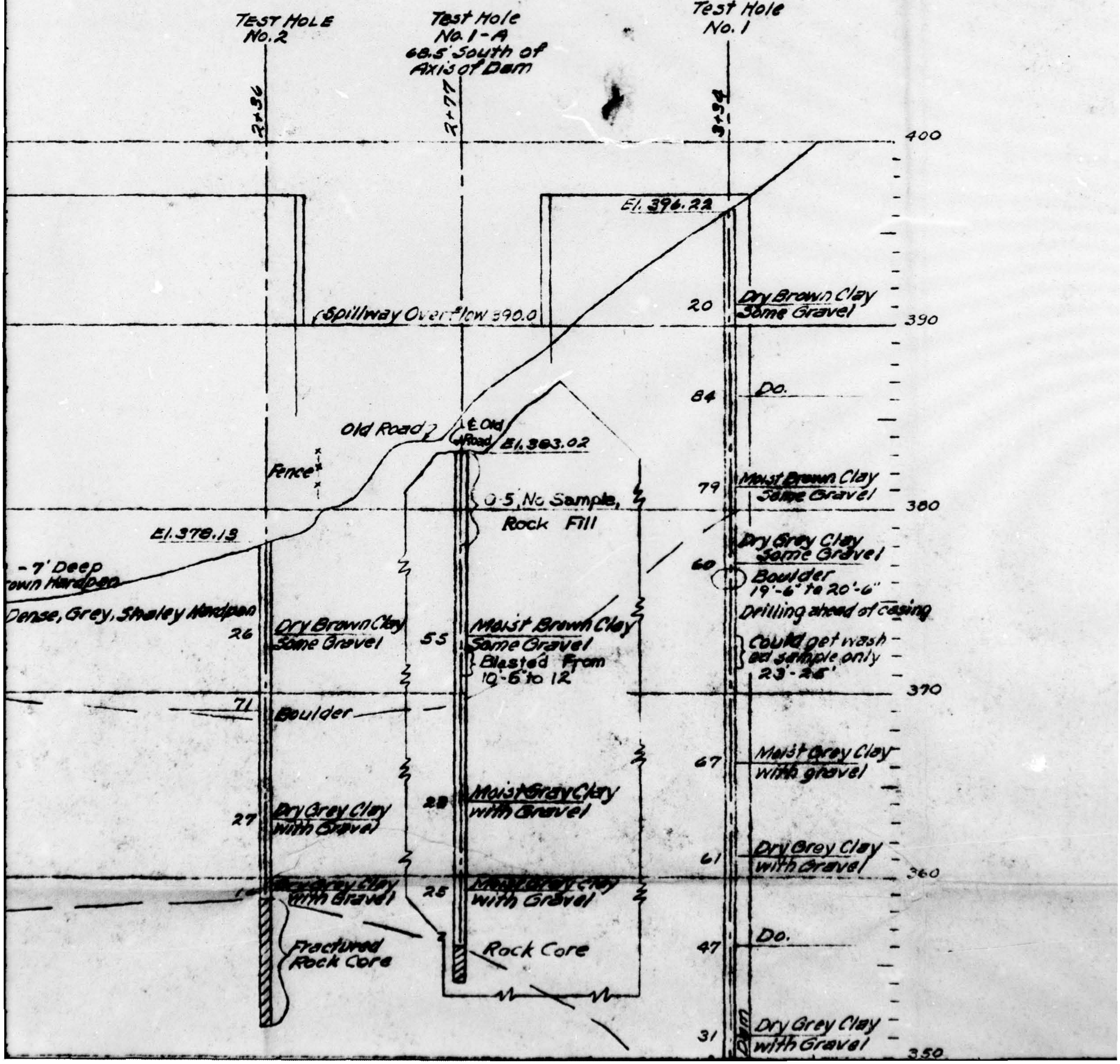
6

SCALE AS SHOWN

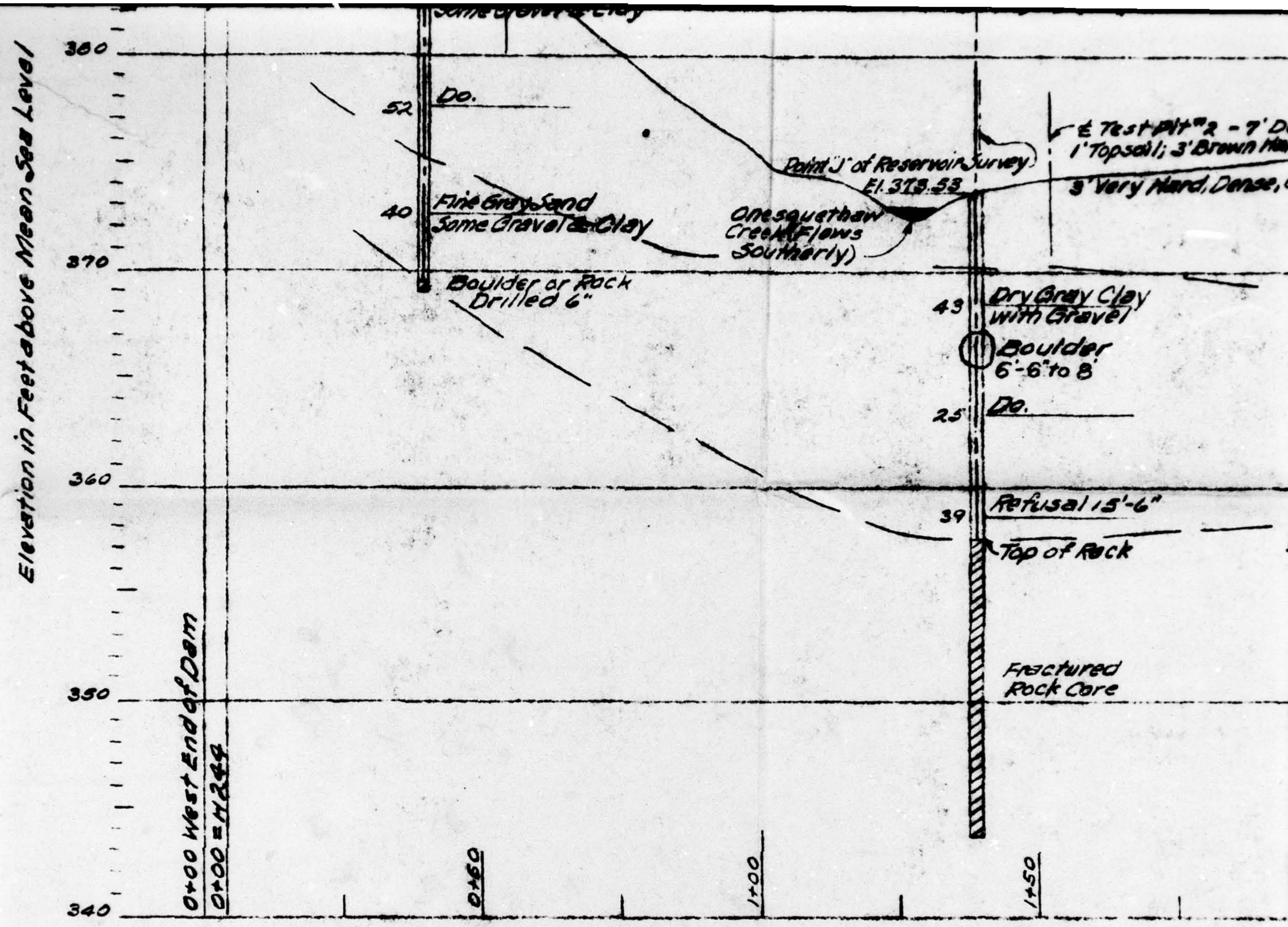
SHEET 2 OF 10


Test Hole No. 4
0+39
Test Hole No. 3
1+39
400
390
380
370
360
Top of Dam Elev. 397.0
El. 387.61
℄ Test Pit #1 - 6½' Deep
Small Rounded Boulder Hardpan
Blows per Foot on Spoon
51
Fine Brown Sand Some Gravel & Clay
52
Do.
40
Fine Gray Sand Some Gravel & Clay
Boulder or Rock Drilled 6"
Point "J" of Reservoir Survey
El. 373.53
Onesquethaw Creek (Flows Southerly)
℄ Test Pit #2 - 7
1' Topsoil; 3' Brown
3' Very Hard, Dens
43
Dry Gray Clay with Gravel
Boulder 6'-6" to 8'
25
Do.
Refusal 15'-6"
39
Top of Rock
Fractured
Elevation in Feet above Mean Sea Level
Dam

2



TEST HOLE No.2
Test Hole No. 1-A 68.5' South of Axis of Dam
Test Hole No. 1
2+36
2+77
3+34
400
390
380
370
360
350
El. 396.22
Spillway Overflow 390.0
20
Dry Brown Clay Some Gravel
84
Do.
Old Road?
℄ Old Road
El. 383.02
Fence
79
Moist Brown Clay Some Gravel
0-5 No Sample, Rock Fill
El. 378.13
- 7' Deep
rown Hardpan
Dry Grey Clay Some Gravel
60
Boulder 19'-6" to 20'-6"
Drilling ahead of casing
Dense, Grey, Shaley Hardpan
26
Dry Brown Clay Some Gravel
55
Moist Brown Clay Some Gravel
Blasted From 10-6 to 12
Could get washed sample only 23'-25'
71
Boulder
67
Moist Grey Clay with gravel
28
Moist Grey Clay with Gravel
27
Dry Grey Clay with Gravel
61
Dry Grey Clay with Gravel
Dry Grey Clay with Gravel
25
Moist Grey Clay with Gravel
Fractured Rock Core
Rock Core
47
Do.
31
Dry Grey Clay with Gravel



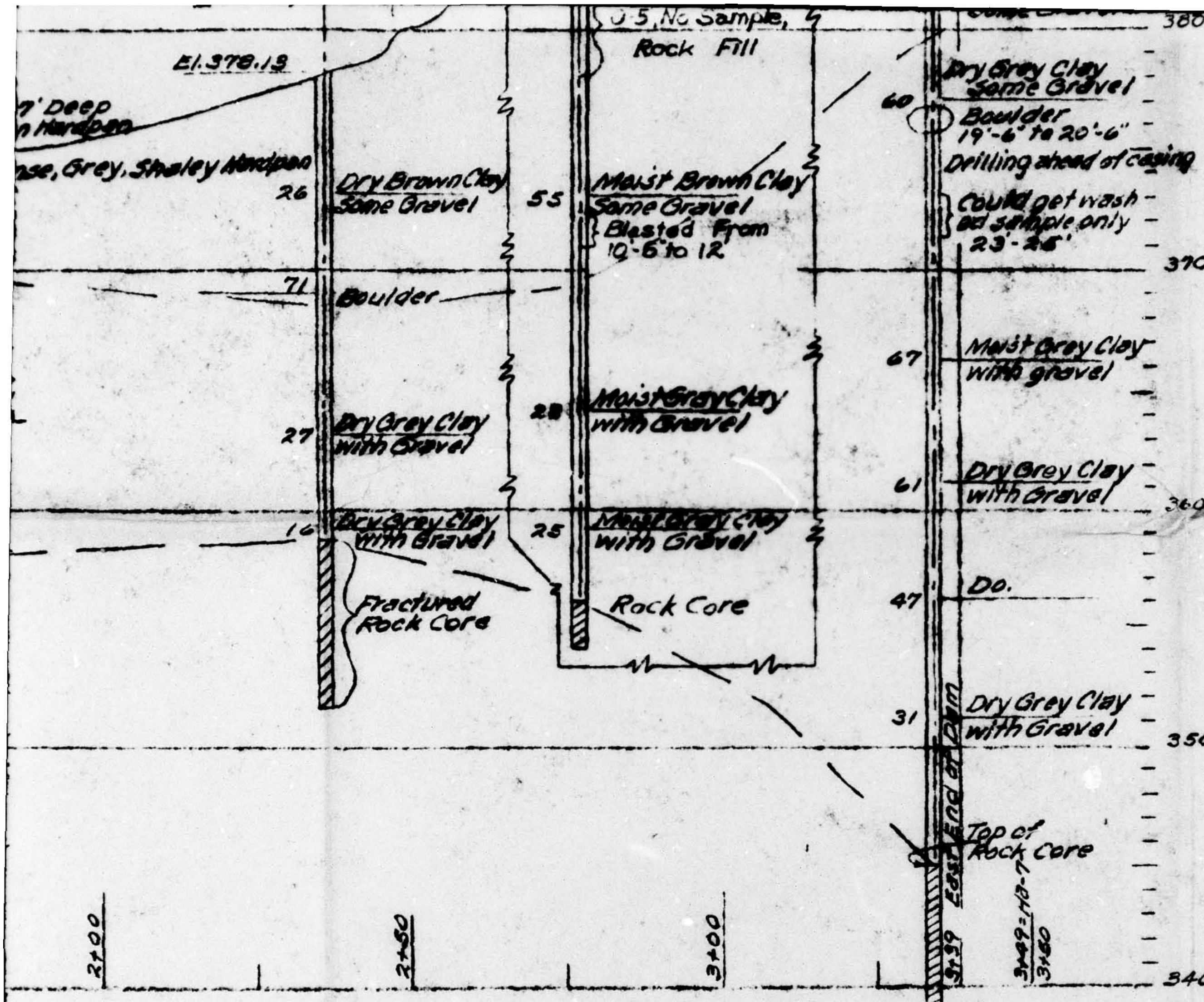
PROFILE: ALONG AXIS OF DAM

Scales: 1" = 20'
1" = 5'

NOTES:-

Log of Test Borings Transcribed from re
Weight of Hammer : 300 lbs.
Distance of Fall : 18 in.
Size of Casing : 2½ in. Extra Hea
Diameter of Sample : 1⅜ in.
Numbers Indicate Blows per Foot on
Borings made during May 1955

3



DAM LOOKING NORTHERLY

= 20' Horiz.
= 5' Vert.

m records of Hall & Co. Inc. Albany, N.Y

Heavy

t on Sampling Spoon

4

WATER DIST

TOWN OF BETHLE

IMPROVEMENTS TO WA

CONTRAC

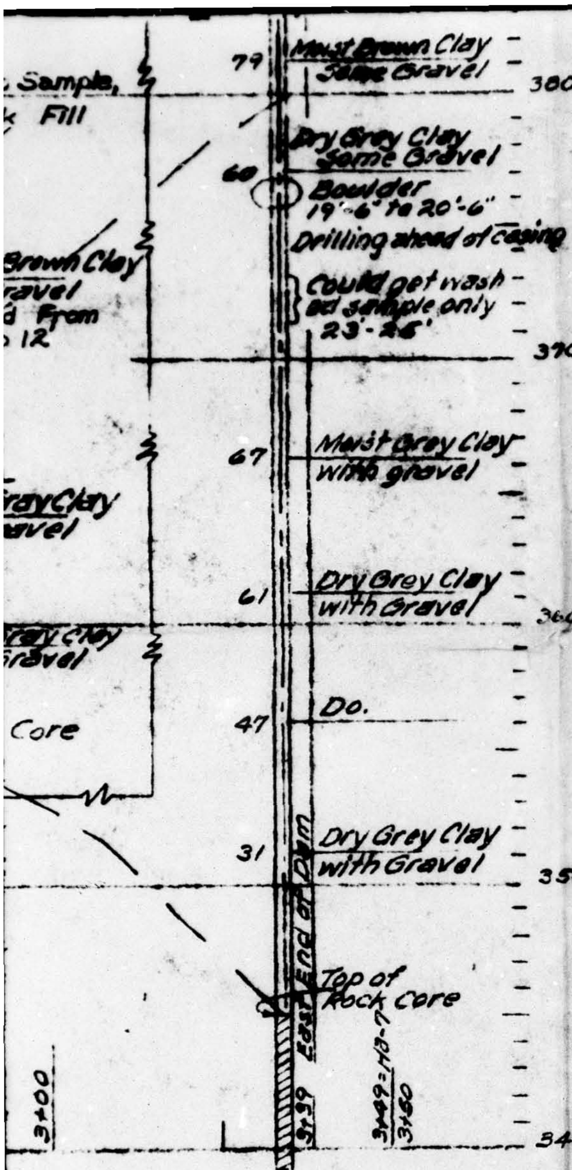
VLY RESER

TEST BO

BENJAMIN L. SMITH & ASSOCIATES

CONSULTING ENGINEERS

SCALE



WATER DISTRICT No.1

TOWN OF BETHLEHEM, NEW YORK

IMPROVEMENTS TO WATER SUPPLY SYSTEM

CONTRACT No.4

VLY RESERVOIR DAM

TEST BORINGS

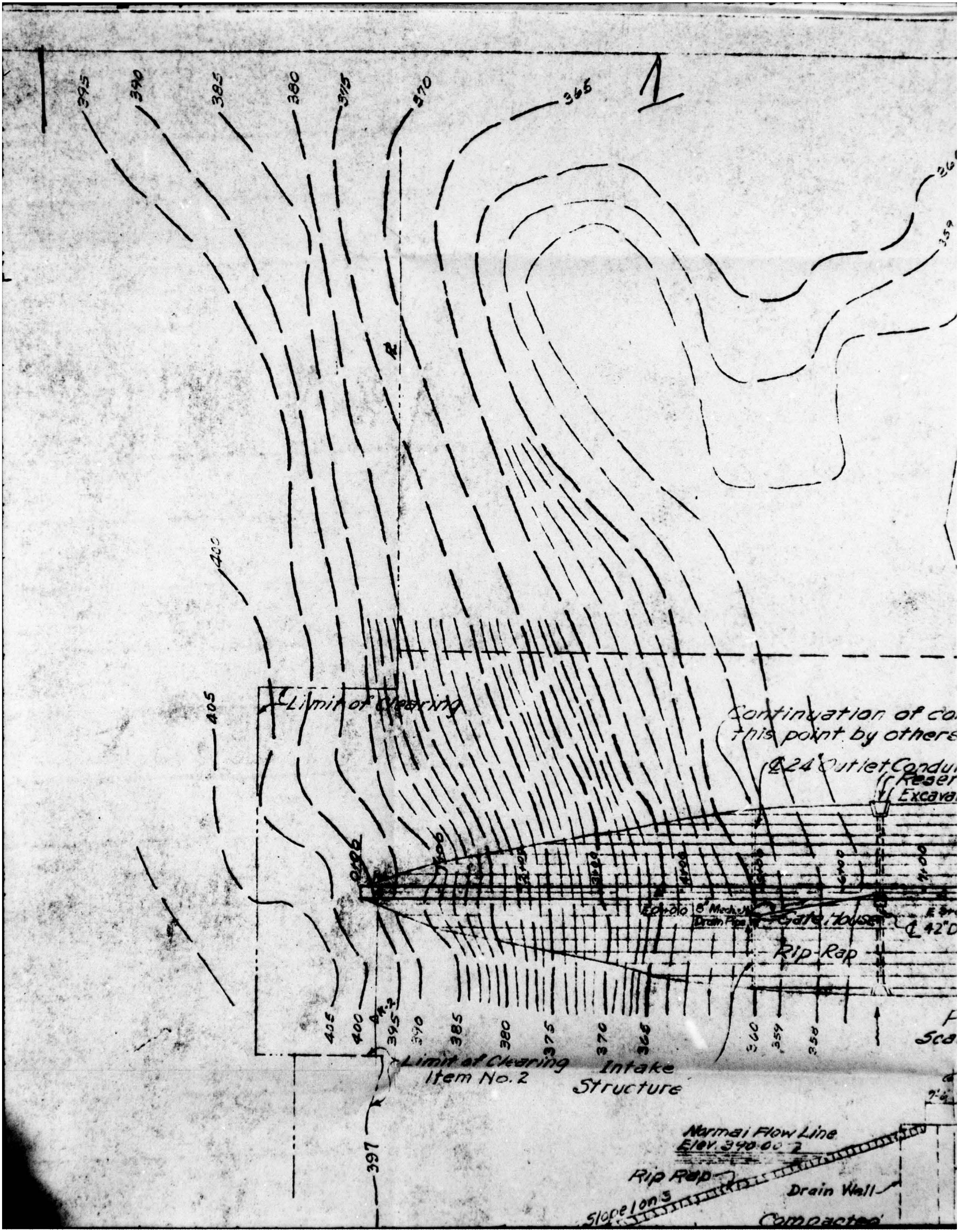
5

BENJAMIN L. SMITH & ASSOCIATES — ALBANY, N.Y.

CONSULTING ENGINEERS — SEPT.

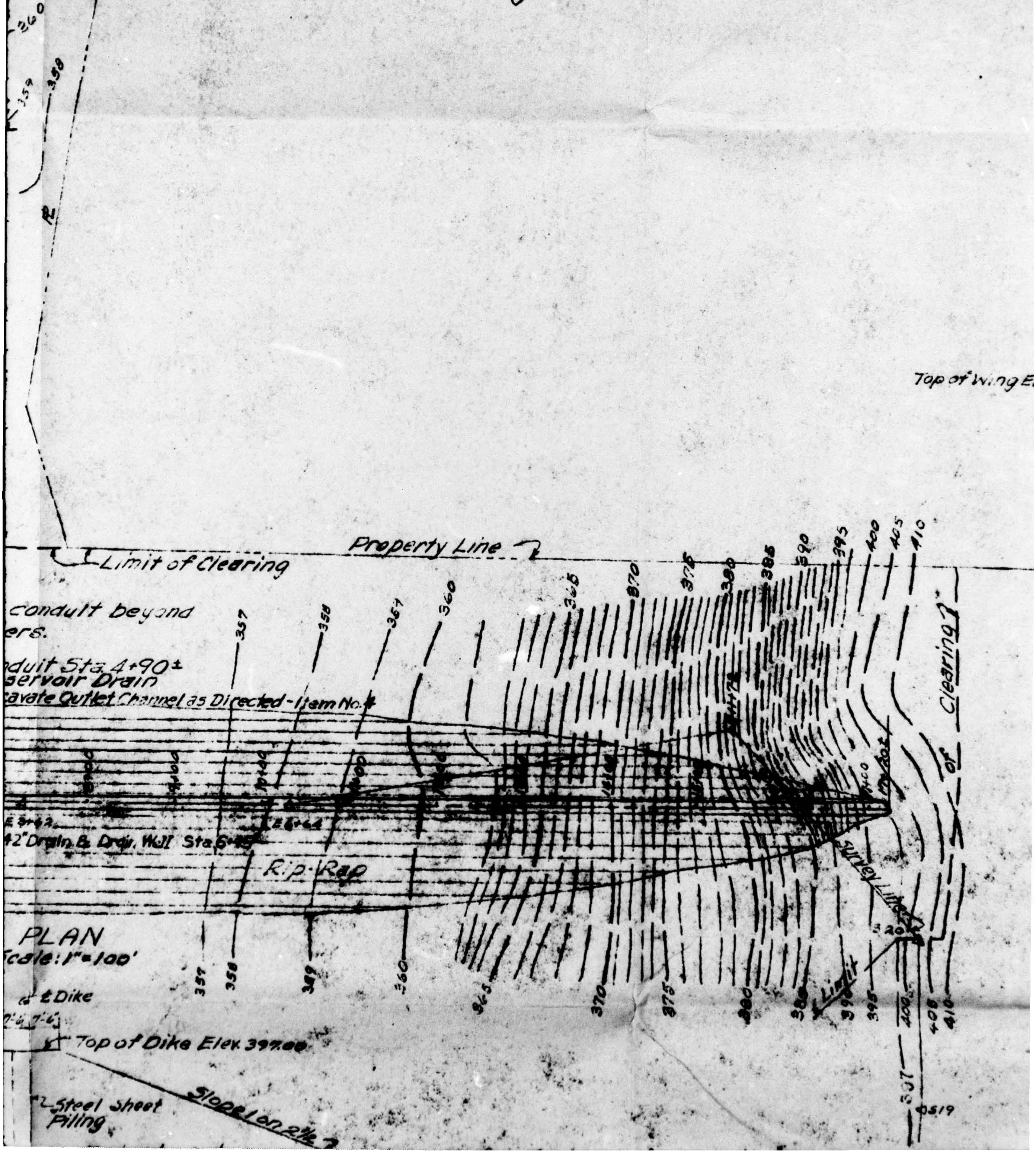
SCALES AS SHOWN

SHEET 3 OF 10

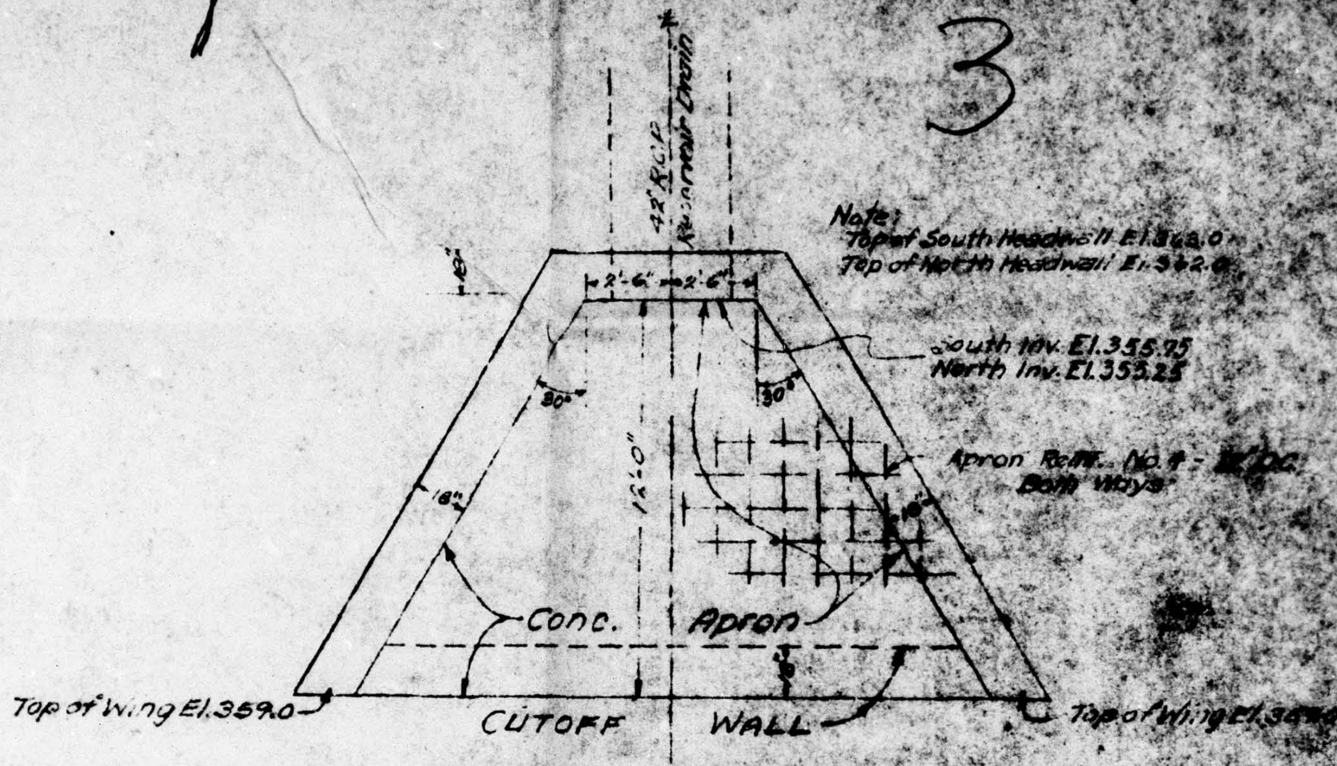


395
390
385
380
375
370
365
359
400
405
Limit of Clearing
Gate House
Rip-Rap
Limit of Clearing
Item No. 2
Intake
Structure
397
366
360
359
350
Normal Flow Line
Elev. 340.00
Rip Rap
Drain Wall
Slope 1 on 3

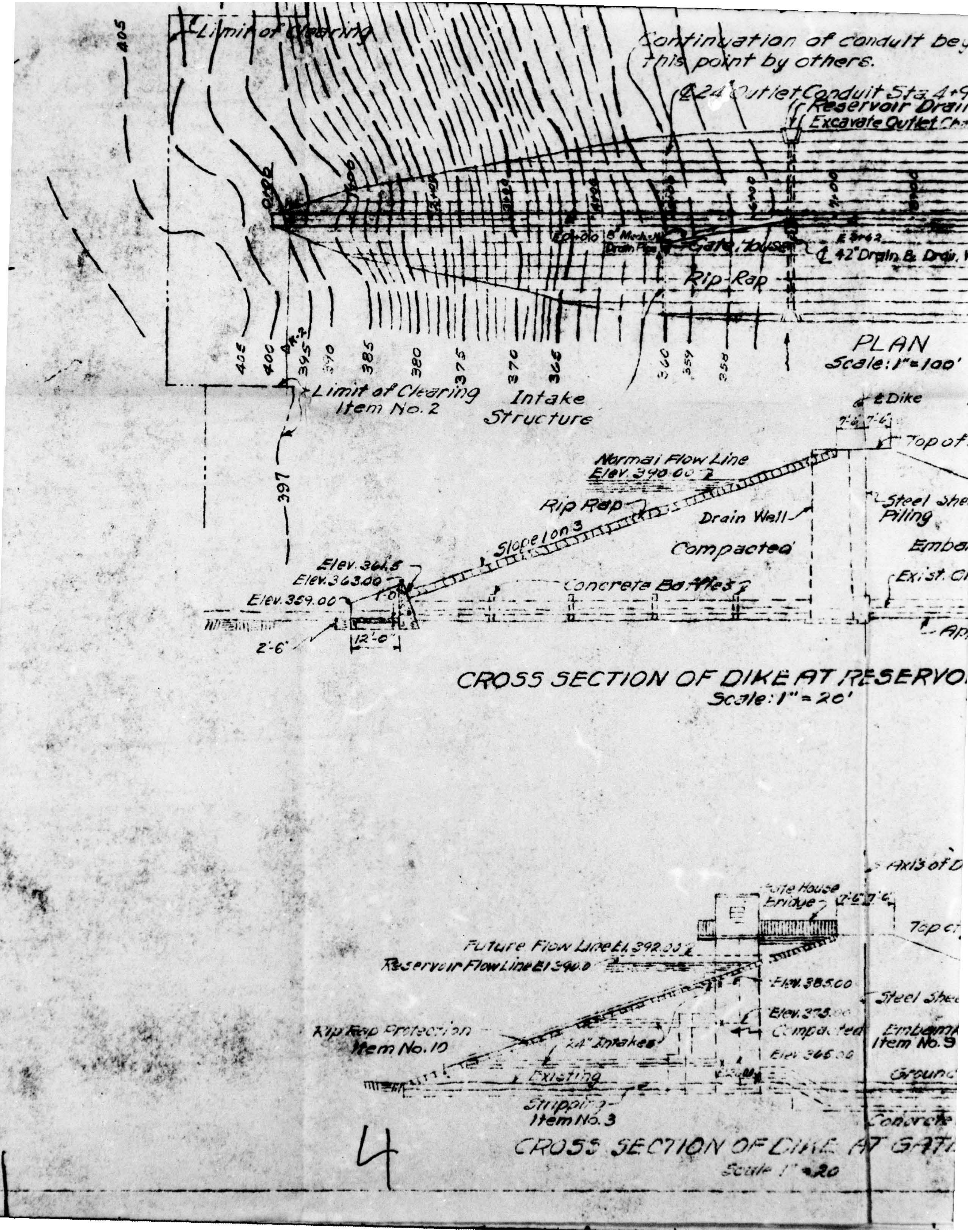
2

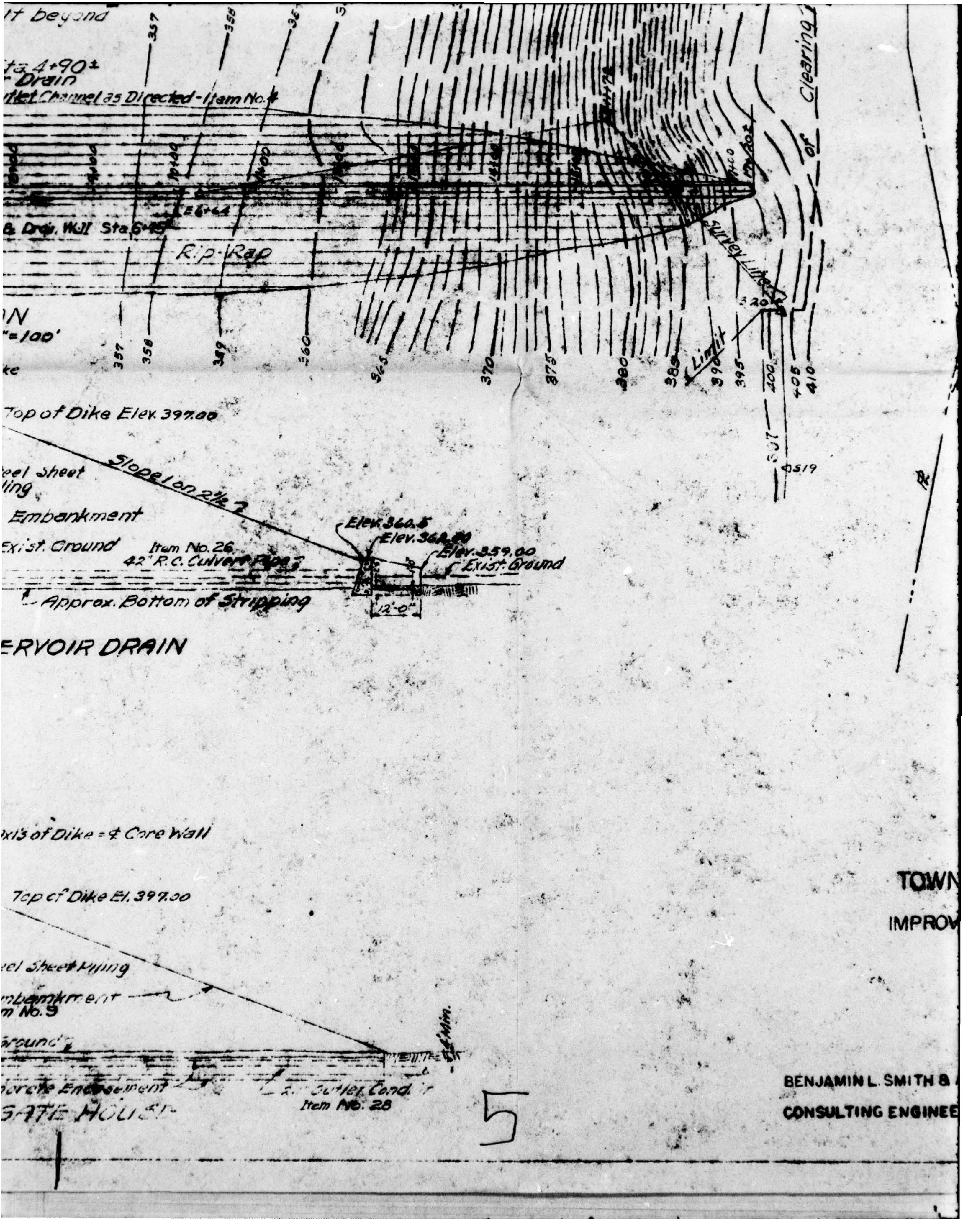

Property Line
Limit of Clearing
conduit beyond
ers.
nduit Sta 4+90±
servoir Drain
cavate Outlet Channel as Directed - Item No. 4
42" Drain & Drop Wall Sta 6+15
Rip-Rap
PLAN
Scale: 1"=100'
℄ Dike
Top of Dike Elev. 397.00
Steel Sheet Piling
Slope 1 on 2½
Top of Wing E
Limit of Clearing
Survey Line
357
358
359
360
365
370
375
380
385
390
395
400
405
410

3

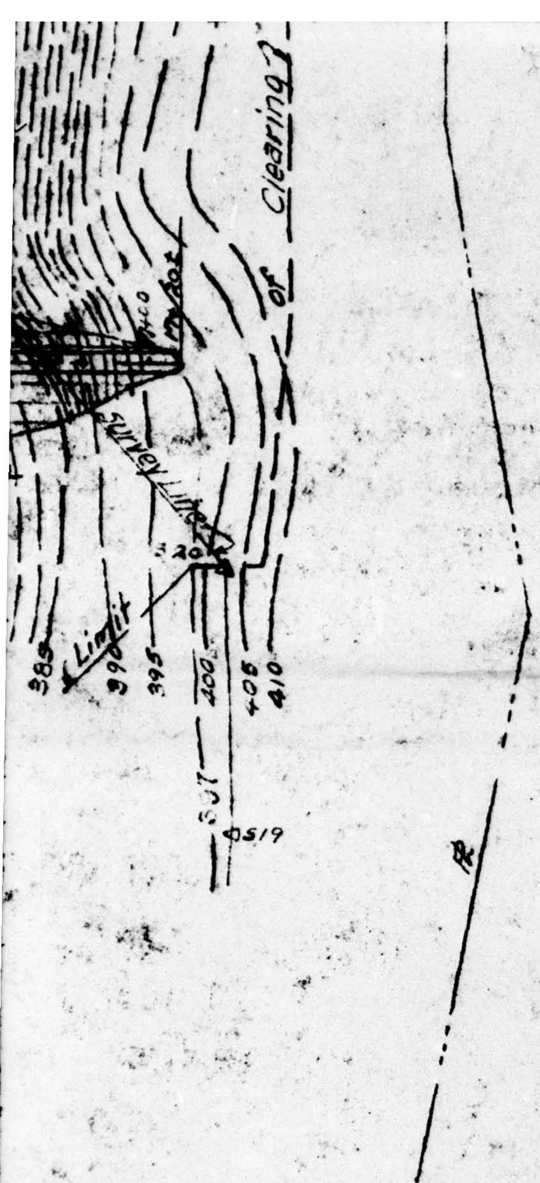


DETAIL OF WINGWALLS
FOR RESERVOIR DRAIN
SCALE: 1/2"=1'-0"


Limit of Clearing
Continuation of conduit beyond this point by others.
℄ 24" Outlet Conduit Sta. 4+9
Reservoir Drain
Excavate Outlet Cha
Gate House
℄ 42" Drain & Drain
Rip-Rap
PLAN
Scale: 1" = 100'
405
400
395
390
385
380
375
370
365
360
359
358
397
Limit of Clearing
Item No. 2
Intake
Structure
℄ Dike
Top of
Normal Flow Line
Elev. 390.00
Rip Rap
Drain Wall
Steel Sheet
Piling
Slope 1 on 3
Compacted
Emban
Elev. 361.5
Elev. 363.00
Elev. 359.00
Concrete Baffles
Exist. Gr
2'-6"
12'-0"
1'-0"
CROSS SECTION OF DIKE AT RESERVOI
Scale: 1" = 20'
Axis of D
Gate House
Bridge
Top of
Future Flow Line El. 392.00
Reservoir Flow Line El. 390.0
Elev. 385.00
Steel Shee
Elev. 375.00
Compacted
Embank
Item No. 9
Rip Rap Protection
Item No. 10
24" Intakes
Elev. 365.00
Existing
Ground
Stripping
Item No. 3
Concrete
CROSS SECTION OF DIKE AT GATE
Scale 1" = 20
4



It beyond
Sta 4+90±
Drain
Outlet Channel as Directed - Item No. 4
E 6+64
& Drain Wall Sta 6+45
Rip-Rap
N
"=100'
ke
357
358
359
360
365
370
375
380
385
390
395
400
405
410
Survey Line
Limit
Clearing
of
320
507
519
Top of Dike Elev. 397.00
eel Sheet
ling
Slope 1 on 2½
Embankment
Exist. Ground
Item No. 26
42" R.C. Culvert Pipe
Elev. 360.5
Elev. 360.00
Elev. 359.00
Exist. Ground
Approx. Bottom of Stripping
12'-0"
ERVOIR DRAIN
xis of Dike = ℄ Core Wall
Top of Dike El. 397.00
eel Sheet Piling
mbankment
m No. 9
Ground
ncrete Encasement
Outlet Conduit
Item No. 28
GATE HOUSE
5
TOWN
IMPROV
BENJAMIN L. SMITH &
CONSULTING ENGINEE



WATER DISTRICT No. 1

TOWN OF BETHLEHEM, NEW YORK

IMPROVEMENTS TO WATER SUPPLY SYSTEM

CONTRACT No. 4

VLY RESERVOIR DIKE

GENERAL PLAN

BENJAMIN L. SMITH & ASSOCIATES
CONSULTING ENGINEERS

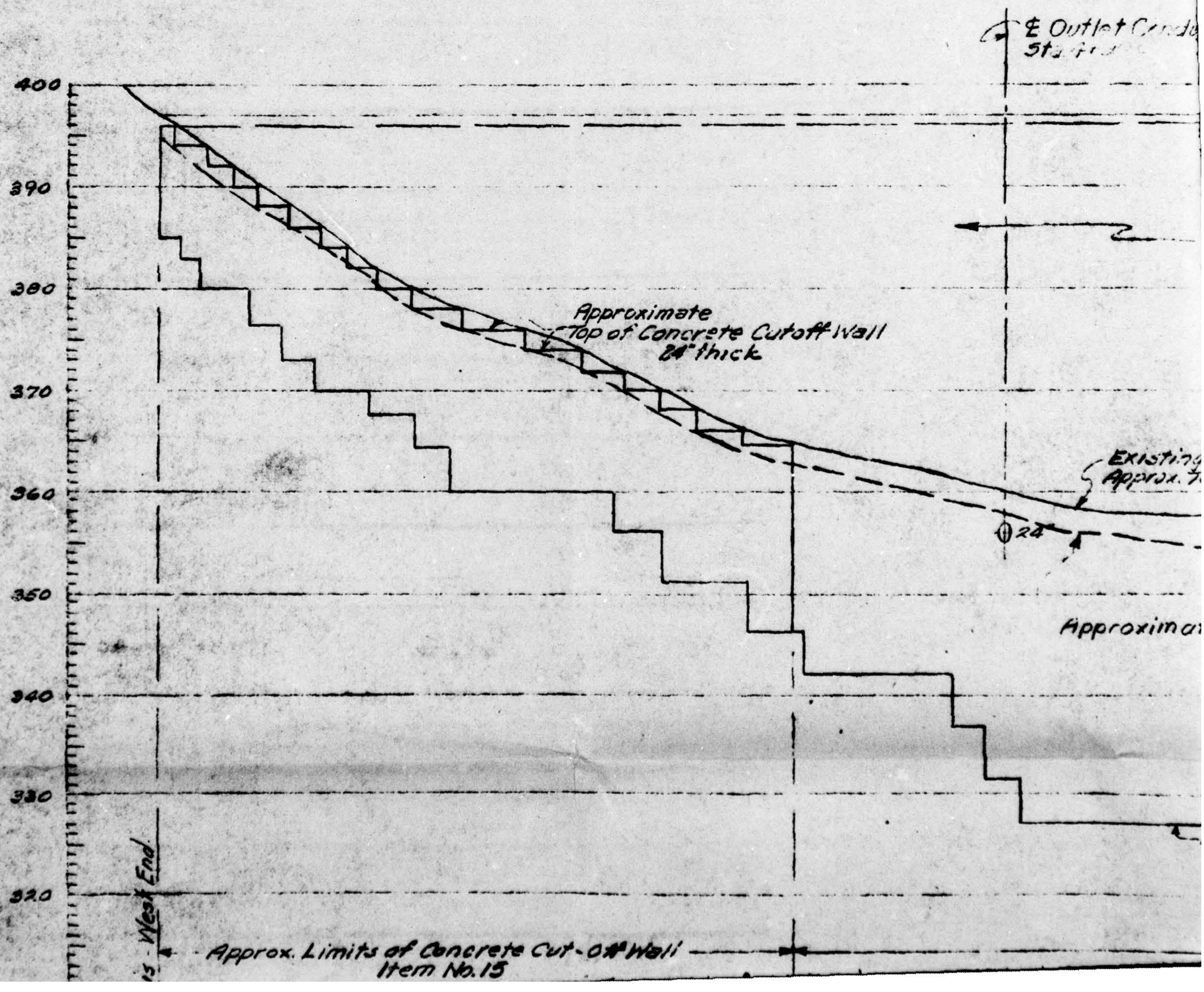
6

ALBANY, N.Y.
SEPT. 19[illegible]

SCALE AS SHOWN

SHEET 4 OF 10

1

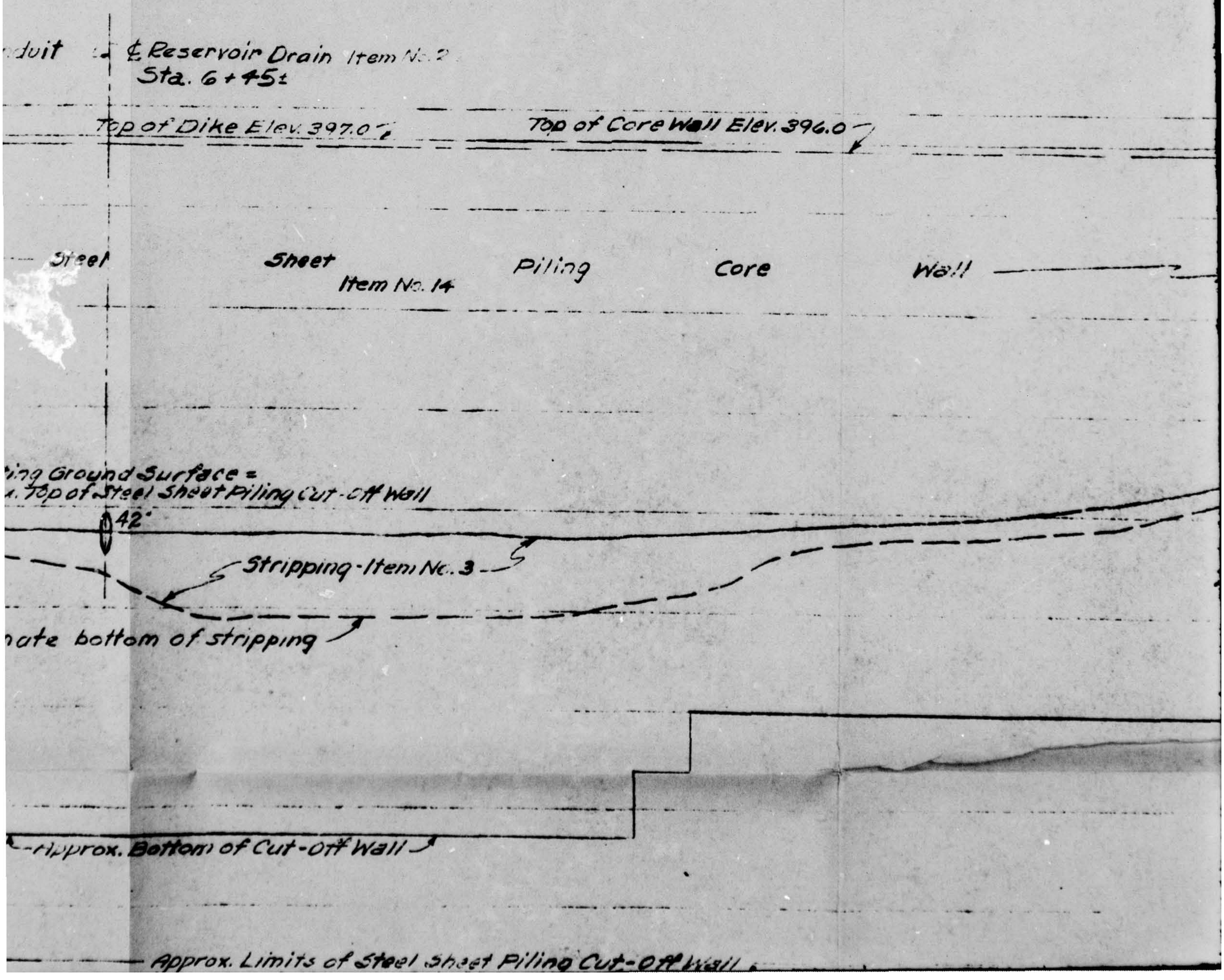


℄ Outlet Condu
Approximate
Top of Concrete Cutoff Wall
24" thick
Existing
Approx.
Approximat
400
390
380
370
360
350
340
330
320
West End
Approx. Limits of Concrete Cut-Off Wall
Item No.15

1

2

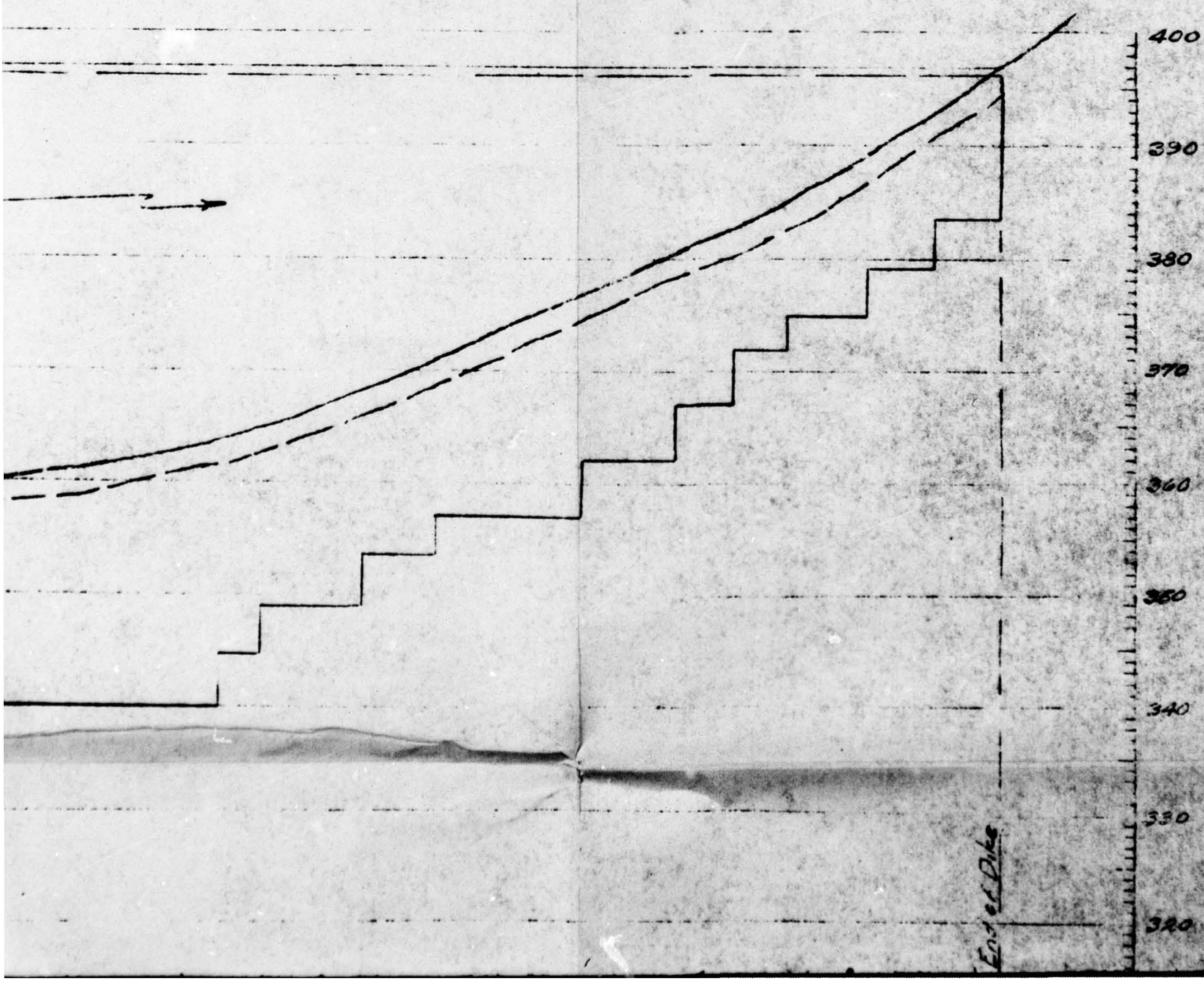
1

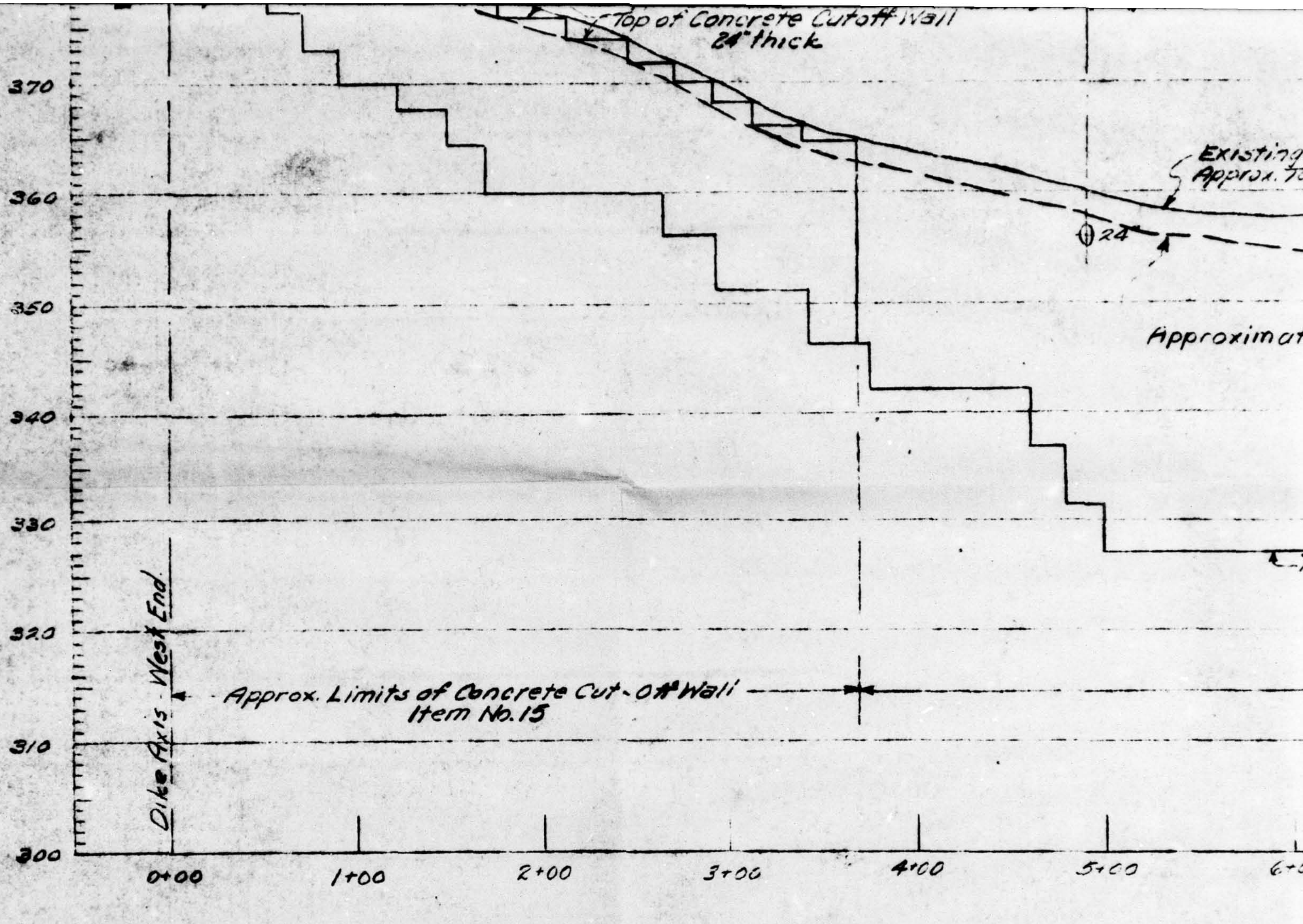


nduit
Reservoir Drain Item No. 2
Sta. 6+45±
Top of Dike Elev. 397.0±
Top of Core Wall Elev. 396.0
Steel
Sheet
Item No. 14
Piling
Core
Wall
ting Ground Surface =
u. Top of Steel Sheet Piling Cut-Off Wall
42"
Stripping-Item No. 3
nate bottom of stripping
Approx. Bottom of Cut-Off Wall
Approx. Limits of Steel Sheet Piling Cut-Off Wall

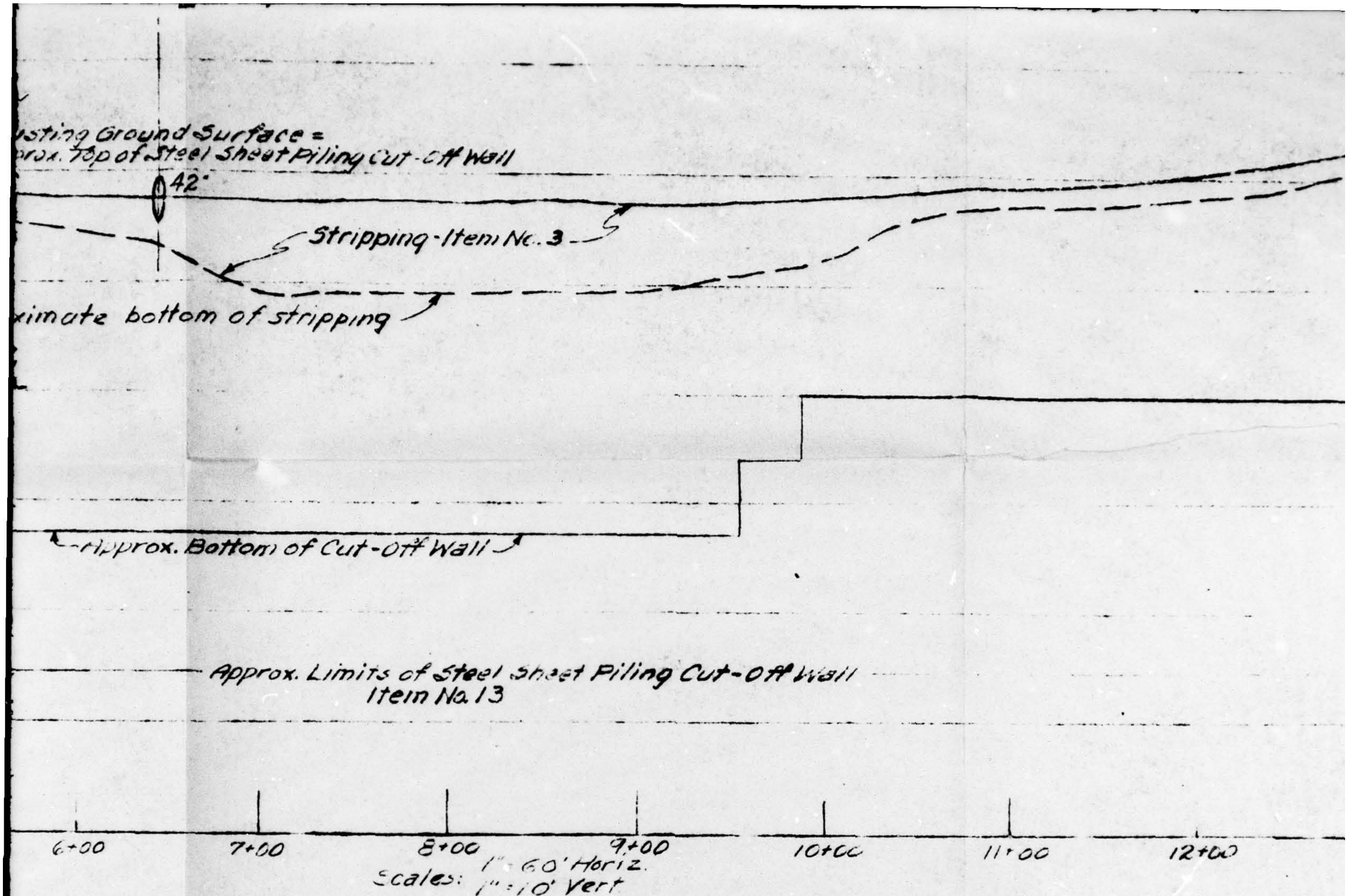
1

3

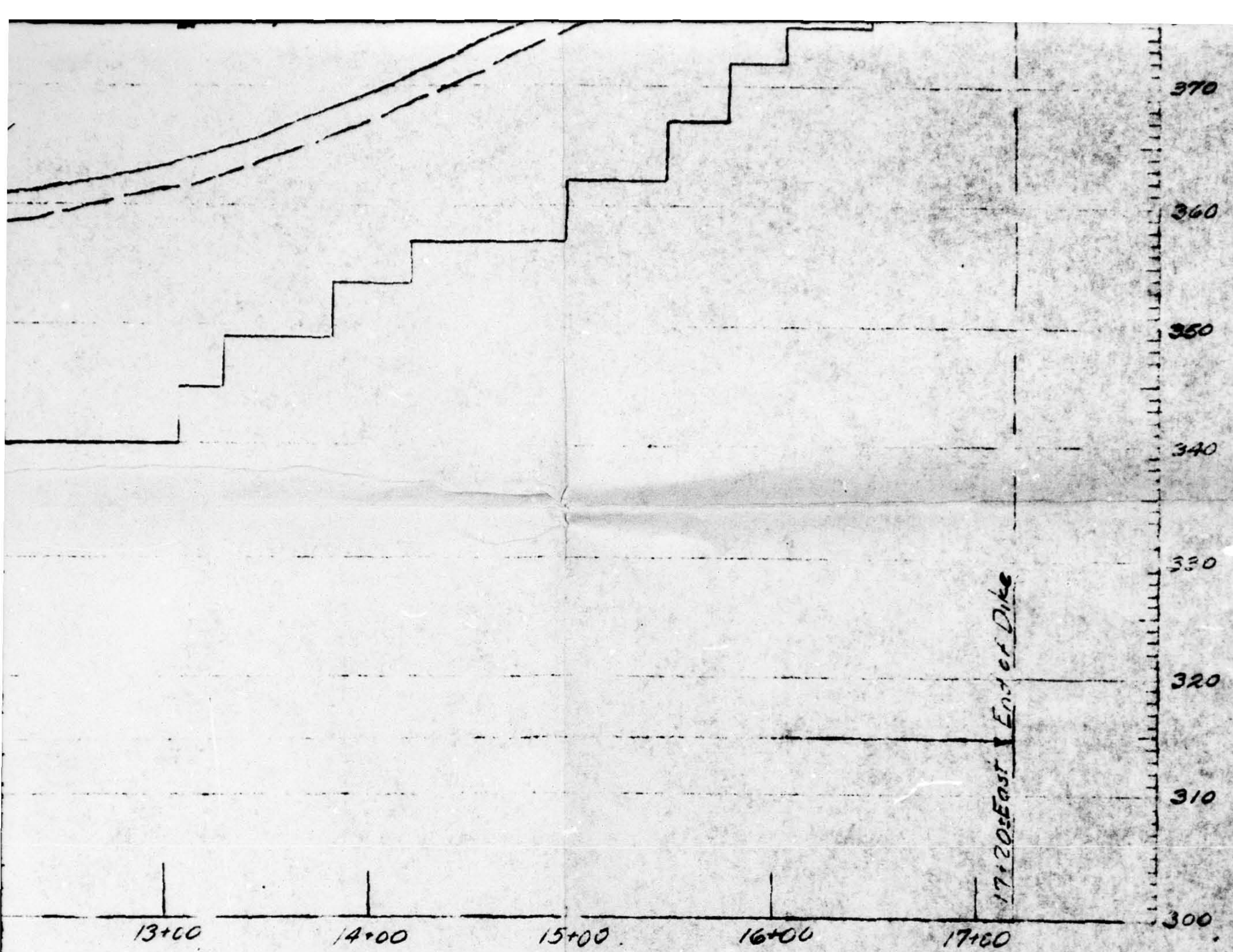



Top of Concrete Cutoff Wall
24" thick
Existing
Approx. To
24"
Approximat
Dike Axis - West End
Approx. Limits of Concrete Cut-off Wall
Item No. 15
370
360
350
340
330
320
310
300
0+00
1+00
2+00
3+00
4+00
5+00
PROFILE ALONG

4



...ONG AXIS OF DIKE LOOKING NORTHERLY



WATER DISTRICT No.1

TOWN OF BETHLEHEM, NEW YORK

IMPROVEMENTS TO WATER SUPPLY SYSTEM

CONTRACT No. 4

VLY RESERVOIR DIKE

PROFILE OF CORE & CUT-OFF WALLS

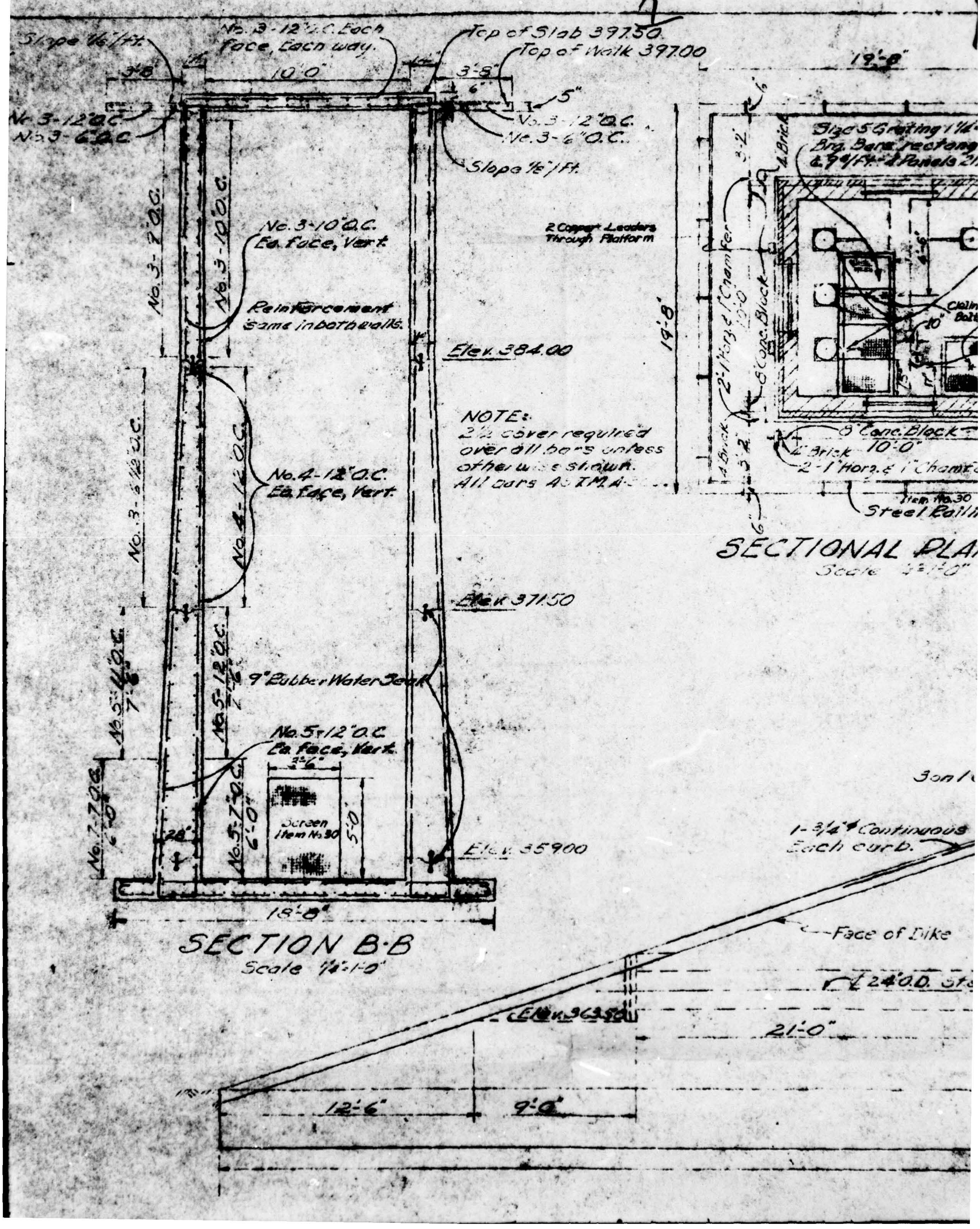
BENJAMIN L. SMITH & ASSOCIATES
CONSULTING ENGINEERS

6

ALBANY, N.Y.
SEPT. 1955

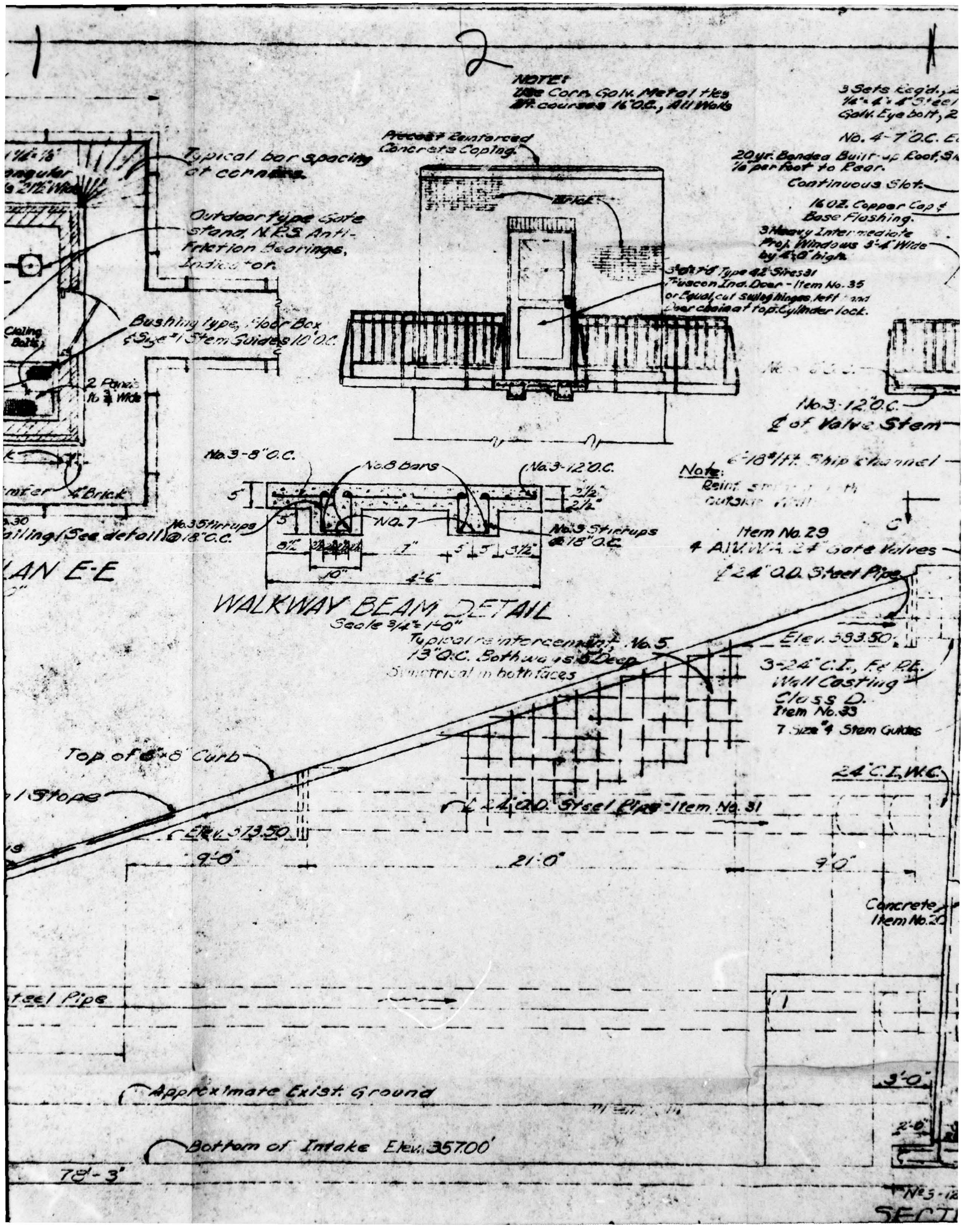
SCALE AS SHOWN

SHEET 5 OF 10

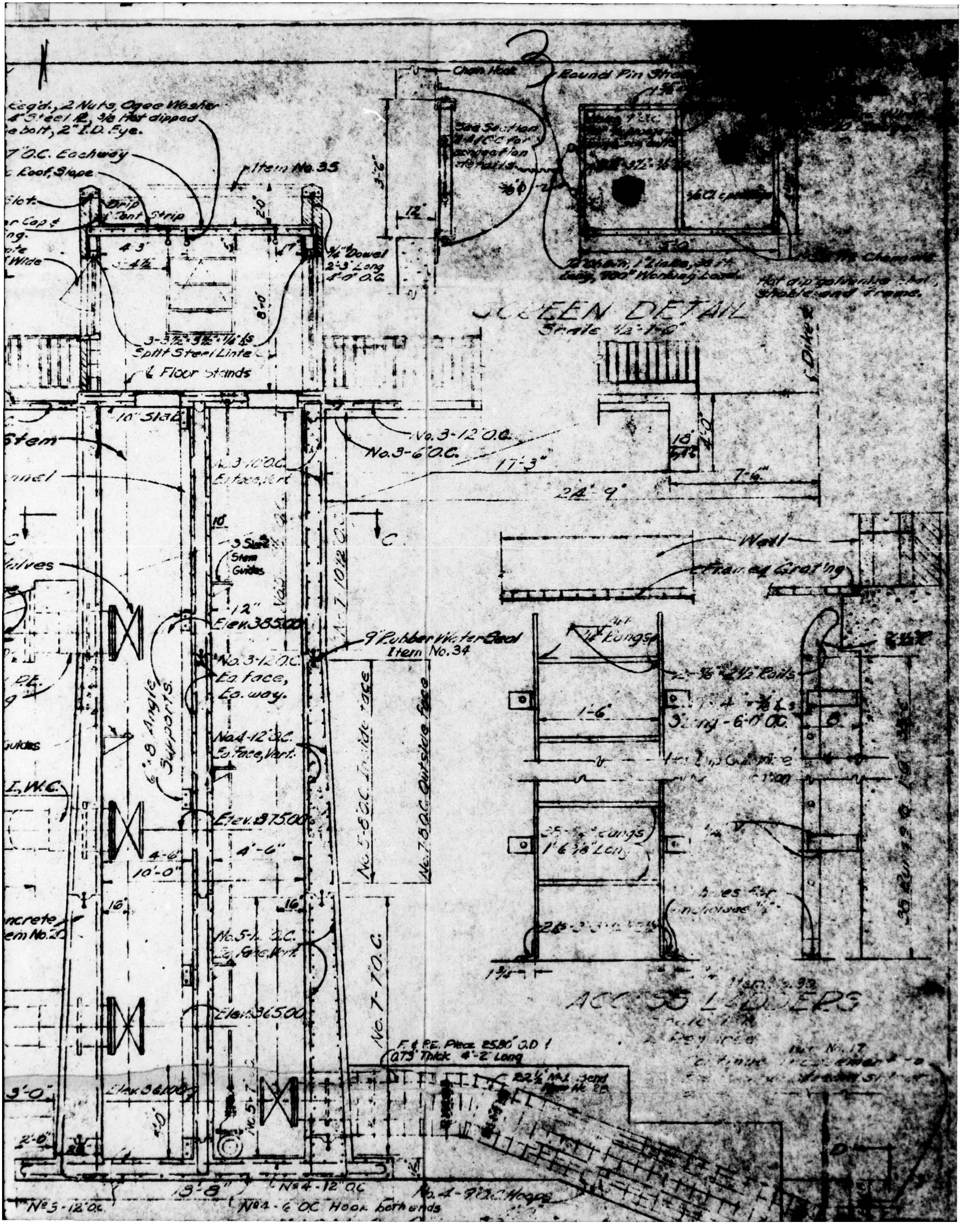


SECTION B-B
Scale 1/4"=1'-0"

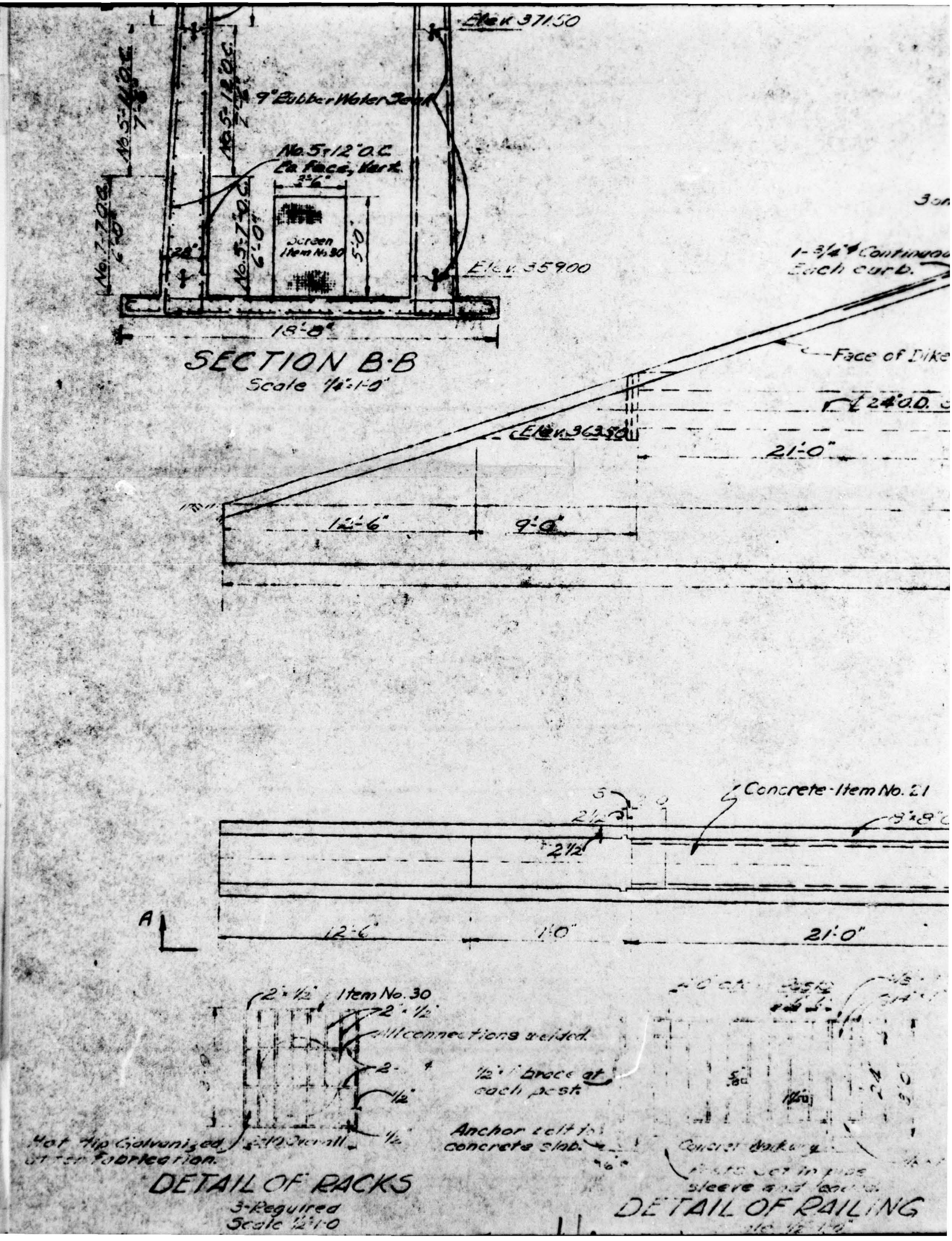
SECTIONAL PLAN
Scale 1/4"=1'-0"



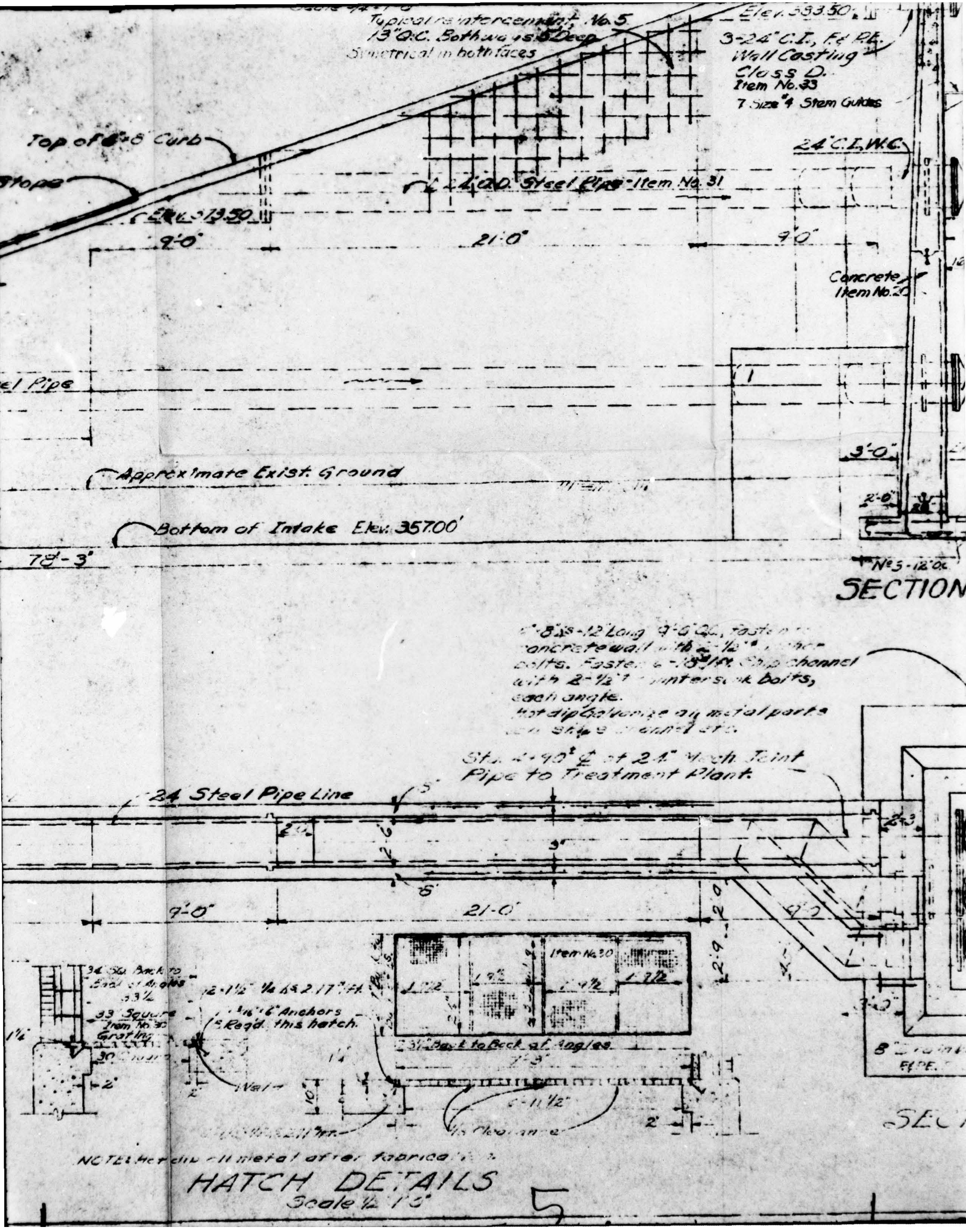
NOTE:
Use Corr. Galv. Metal ties
4th courses 16" O.C., All Walls
Precast Reinforced
Concrete Coping.
Brick
Typical bar spacing
at corners.
Outdoor type Gate
stand, N.R.S. Anti-
Friction Bearings,
Indicator.
Bushing type, Floor Box
& Size #1 Stem Guides 10" O.C.
Ceiling
Bolts
2 Panels
to 3/4 Wide
4" Brick
3 Sets Req'd.
Galv. Eye bolt, 2
No. 4-7" O.C. E
20 yr. Bonded Built-up Roof, Sl
1/4" per foot to Rear.
Continuous Slot.
16 OZ. Copper Cap &
Base Flashing.
3 Heavy Intermediate
Proj. Windows 3'-4" Wide
by 4'-0" high.
Tiuscon Ind. Door - Item No. 35
or Equal, cut swing hinges, left hand
Door chain at top. Cylinder lock.
No. 3-12" O.C.
℄ of Valve Stem
No. 3-8" O.C.
No. 8 Bars
No. 3-12" O.C.
No. 3 Stirrups
@ 18" O.C.
No. 7
No. 3 Stirrups
@ 18" O.C.
5"
2 1/2"
2 1/2"
8 1/2"
7"
5"
5"
3 1/2"
10"
4'-6"
Railing (See detail)
LAN E-E
WALKWAY BEAM DETAIL
Scale 3/4" = 1'-0"
6"-18#/ft. Ship Channel
Note:
Item No. 29
4 A.W.W.A. 24" Gate Valves
℄ 24" O.D. Steel Pipe
Elev. 383.50'
Typical reinforcement, No. 5
13" O.C. Bothways 3" Deep
Symetrical in both faces
3-24" C.I., F& P.E.
Wall Casting
Class D.
Item No. 33
7 Size #4 Stem Guides
Top of 8"x8" Curb
1 Slope
24" C.I.W.C.
℄ 24" O.D. Steel Pipe - Item No. 31
Elev. 373.50
9'-0"
21'-0"
9'-0"
Concrete
Item No. 2
Steel Pipe
Approximate Exist. Ground
Bottom of Intake Elev. 357.00'
78'-3"
3'-0"
2'-6"
SECTI



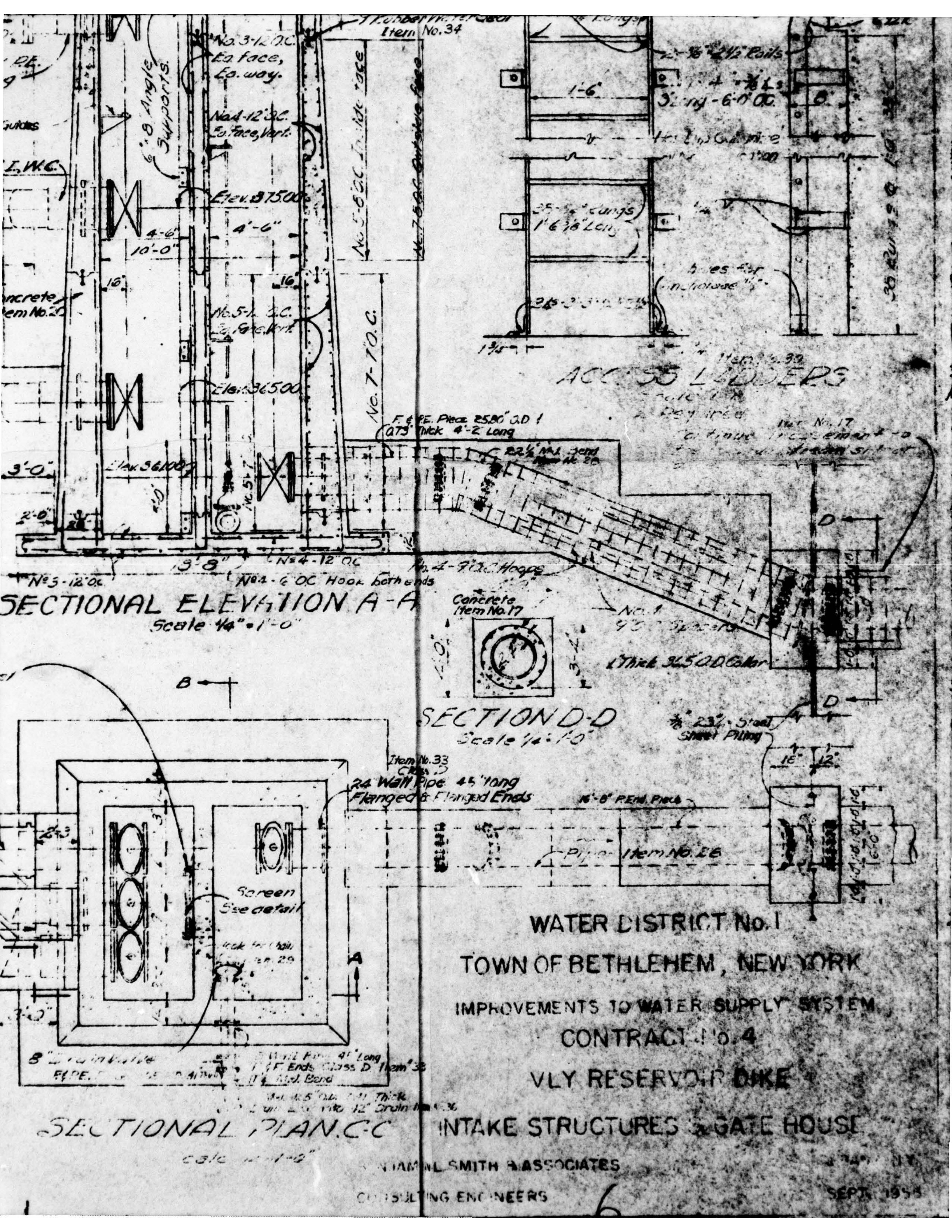
Reqd., 2 Nuts, Ogee Washer
4" Steel R, 3/8 Hot dipped
Eye bolt, 2" I.D. Eye.
7" O.C. Eachway
Roof Slope
Item No. 35
Drip
Cont. Strip
Slot.
3/4" Dowel
2'-3" Long
4'-0" O.C.
3-3 1/2" 3 1/2" 1/4" Ls
Split Steel Lintel
℄ Floor Stands
10" Slab
Stem
No. 3-12" O.C.
No. 3-6" O.C.
No. 3-10" O.C.
Ea. face, Vert.
3 Sets
Stem
Guides
Valves
12"
Elev. 385.00
9" Rubber Water Seal
Item No. 34
No. 3-12" O.C.
Ea. face,
Ea. way.
6" 8 Angle Supports
No. 4-12" O.C.
Ea. Face, Vert.
No. 5-6" O.C. Inside Face
No. 7-5" O.C. Outside Face
Guides
E.W.C.
Elev. 375.00
4'-6"
4'-6"
10'-0"
16"
16"
Concrete
Item No. 20
No. 5-1 O.C.
Ea. Face, Vert.
No. 7-7" O.C.
Elev. 365.00
F. & P.E. Piece 25.80" O.D. 1
0.73" Thick 4'-2" Long
22 1/2° M.J. Bend
Item No. 28
3'-0"
Elev. 361.00
2'-0"
13'-8"
No. 4-12" O.C.
No. 3-12" O.C.
No. 4-6" O.C. Hook both ends
No. 4-9" O.C. Hoops
Chain Hook
Round Pin Sh
1 1/2"
See Section
for
details
3'-6"
12"
3'-0"
1/2" Chain, 1" Links, 36 ft.
long, 900# Working Load
Hot dip galvanize chain,
shackle and frame.
SCREEN DETAIL
Scale 1/2" = 1'-0"
℄ Dike
18"
4'-0"
17'-3"
7'-6"
24'-9"
Wall
Framed Grating
24
Rungs
2-3/8" x 2 1/2 Rails
1'-6"
3" Long - 6'-0" O.C.
35 Rungs
1'-6 1/8" Long
Holes for
1 1/2"
Item No. 33
ACCESS LADDERS
Item No. 17



Elev. 371.50
9" Rubber Water Seal
No. 5-12" O.C.
Ea. Face, Vert.
2'-6"
5'-0"
Screen
Item No. 30
No. 5-7" O.C.
6'-0"
No. 7-7" O.C.
Elev. 359.00
18'-8"
SECTION B-B
Scale 1/4"=1'-0"
1-3/4" Continuous
Each curb.
Face of Dike
24" O.D.
Elev. 363.50
21'-0"
12'-6"
9'-0"
Concrete-Item No. 21
2 1/2
12'-6"
1'-0"
21'-0"
A
2" x 1/2"
Item No. 30
All connections welded.
1/2" brace at each post.
Anchor bolt to concrete slab.
Hot dip Galvanized after fabrication.
DETAIL OF RACKS
3-Required
Scale 1/2"=1'-0"
Posts set in pipe sleeve and leaded.
DETAIL OF RAILING

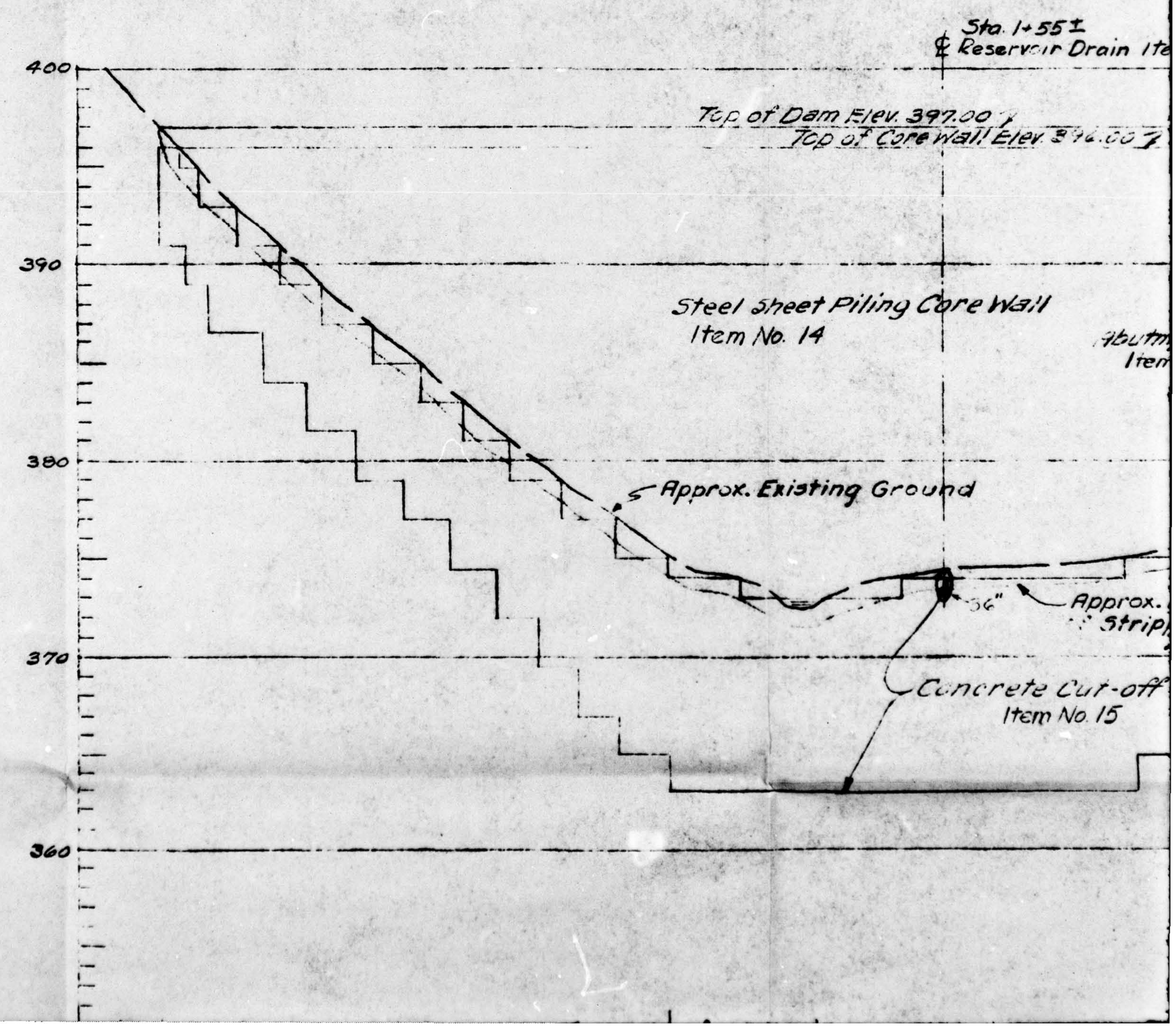


Typical reinforcement, No. 5
13" O.C. Bothways 5" Deep
Symetrical in both faces
Elev. 383.50
3-24" C.I., F & P.E.
Wall Casting
Class D.
Item No. 33
7 Size 4 Stem Guides
Top of 8"x8" Curb
Slope
24" C.I. W.C.
24" O.D. Steel Pipe - Item No. 31
Elev. 373.50
9'-0"
21'-0"
9'-0"
Concrete
Item No. 20
Steel Pipe
3'-0"
Approximate Exist. Ground
2'-0"
Bottom of Intake Elev. 357.00'
78'-3"
No 5 - 12" O.C.
SECTION
Hot dip Galvanize all metal parts
Sta. 4+90± ℄ at 24" Mech. Joint
Pipe to Treatment Plant.
24" Steel Pipe Line
2'-6"
3'
9'-0"
21'-0"
Item No. 30
34 Sq. Back to Back of Angles
33" Square
Item No. 30
Grating
1 1/4"
2-1 1/2" x 1/4" Ls 2.17 #/Ft.
4-3/16" x 6" Anchors
Reqd. this hatch.
Wall
2"
1 1/4"
2 3/4" Back to Back of Angles
2'-9"
2'-11 1/2"
1/8" Clearance
2"
8" Drain
F. & P.E.
NOTE: Hot dip all metal after fabrication.
HATCH DETAILS
Scale 1/2" = 1'-0"
5
SEC



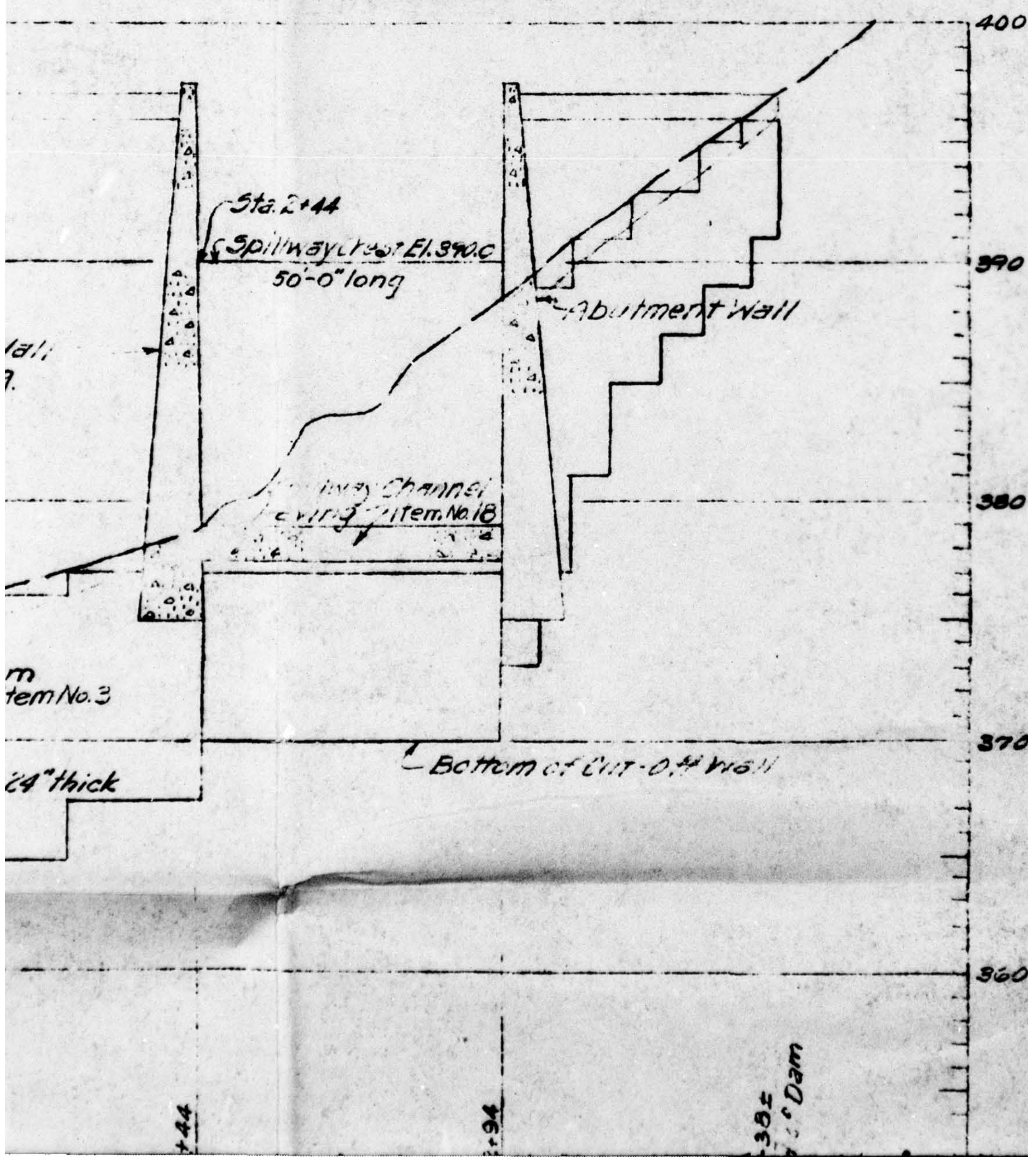
SECTIONAL ELEVATION A-A
Scale 1/4" = 1'-0"
ACCESS LADDERS
SECTION D-D
Scale 1/4" = 1'-0"
SECTIONAL PLAN C-C
Concrete Item No.17
F. & P.E. Piece 25.80" O.D. 1 0.75" Thick 4'-2" Long
24 Wall Pipe 45" Long Flanged & Flanged Ends
Item No.33 Class D
Pipe Item No.26
Screen See detail
3/8" 23 1/2 Steel Sheet Piling
WATER DISTRICT No.1
TOWN OF BETHLEHEM, NEW YORK
IMPROVEMENTS TO WATER SUPPLY SYSTEM
CONTRACT No.4
VLY RESERVOIR DIKE
INTAKE STRUCTURES & GATE HOUSE
CONSULTING ENGINEERS

1

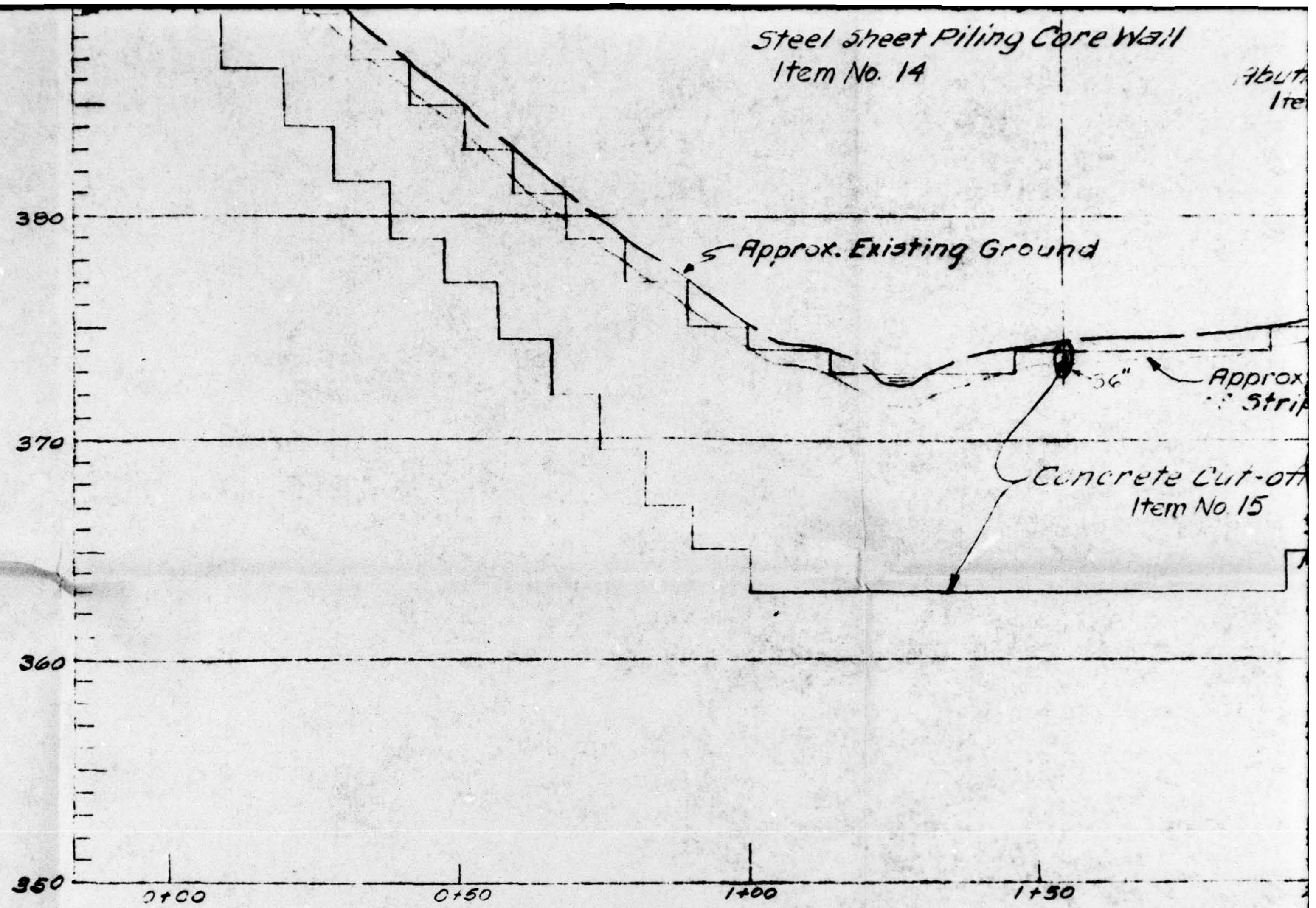


Sta. 1+55±
℄ Reservoir Drain
400
Top of Dam Elev. 397.00
Top of Core Wall Elev.
390
Steel Sheet Piling Core Wall
Item No. 14
380
Approx. Existing Ground
Approx.
370
Concrete Cut-off
Item No. 15
360

2

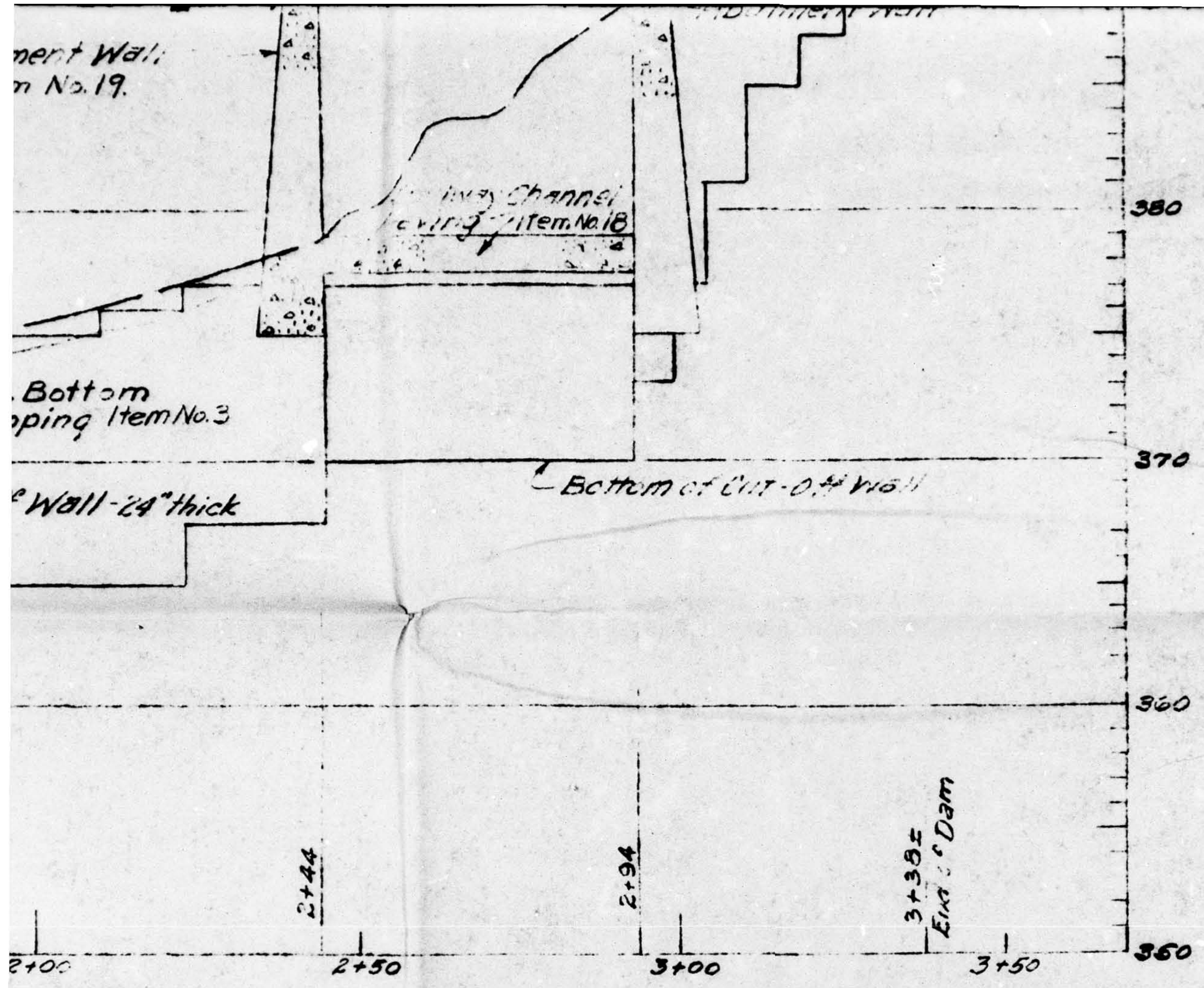


Sta. 2+44
Spillway Crest El. 390.0
50'-0" long
Abutment Wall
Bottom of Cut-Off Wall
24" thick
400
390
380
370
360



PROFILE ALONG AXIS OF DA

3



M LOOKING NORTHERLY

Horiz.
Vert.

WATER DIST

TOWN OF BETHLEH

IMPROVEMENTS TO WAT

CONTRAC

VLY RESER

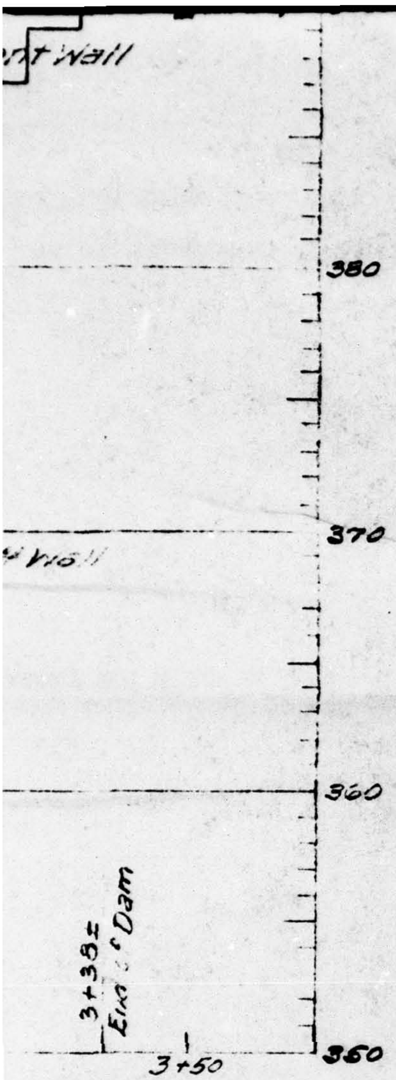
PROFILE OF CORE &

BENJAMIN SMITH & ASSOCIATES

CONSULTING ENGINEERS

SCALES

4



WATER DISTRICT No.1

TOWN OF BETHLEHEM, NEW YORK

IMPROVEMENTS TO WATER SUPPLY SYSTEM

CONTRACT No.4

VLY RESERVOIR DAM

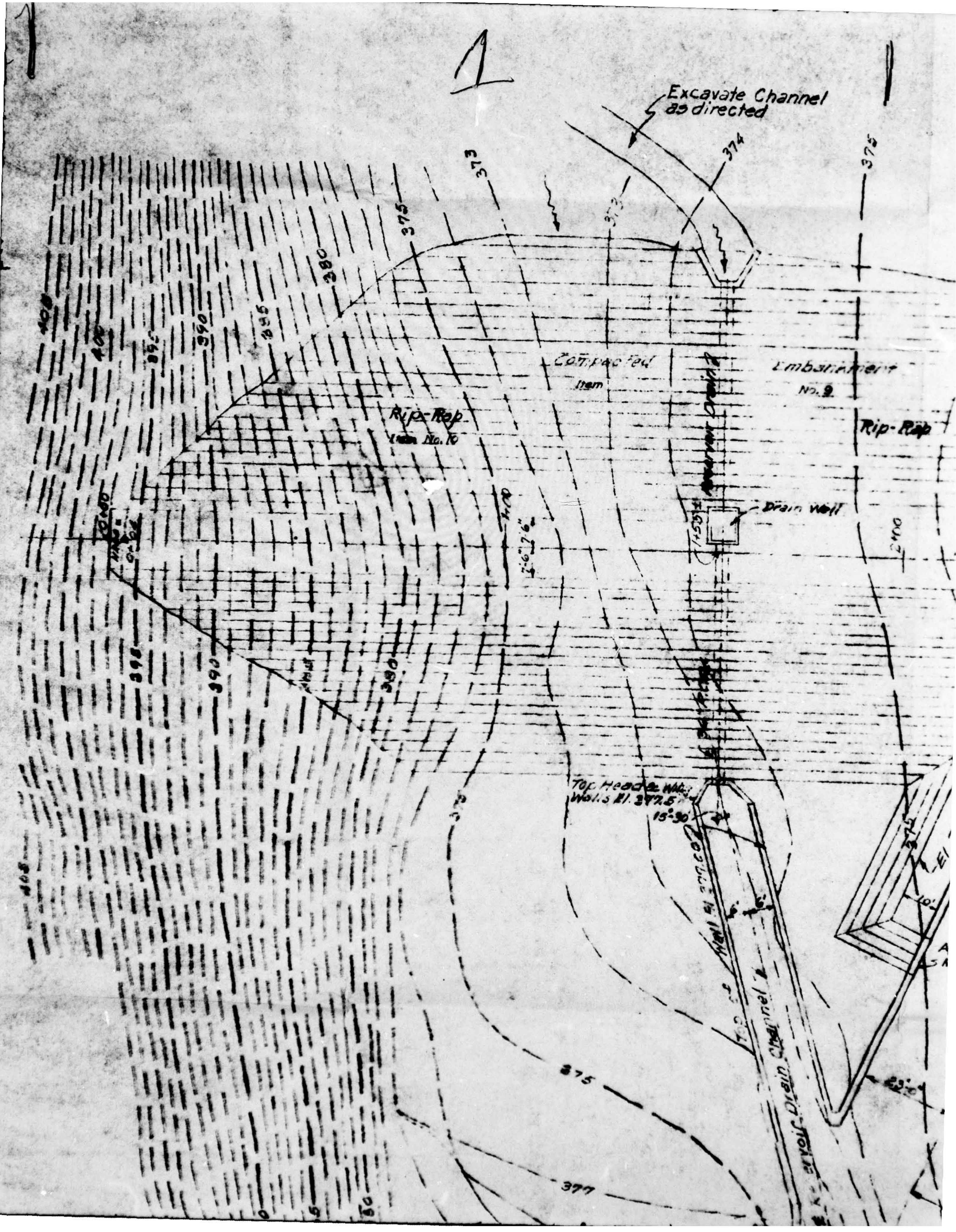
PROFILE OF CORE & CUTOFF WALLS

BENJAMIN L SMITH & ASSOCIATES — ALBANY N.Y.

CONSULTING ENGINEERS — SEPT 1955

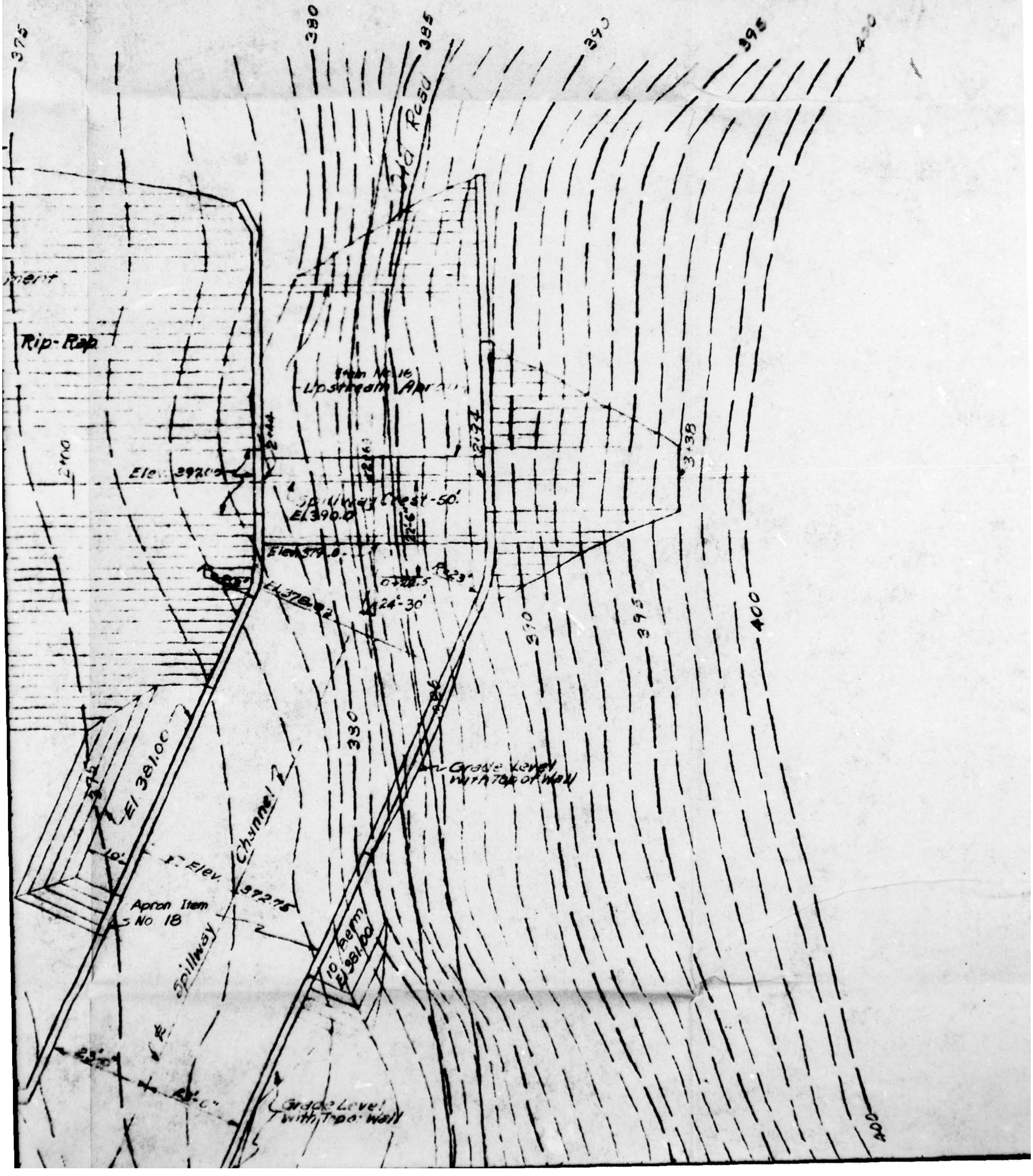
SCALES AS SHOWN

SHEET 8 OF 10



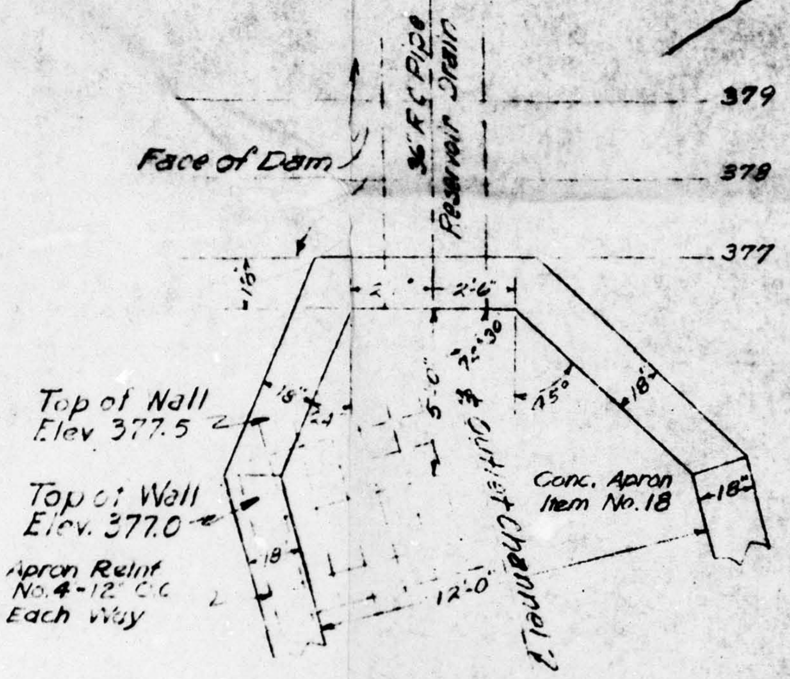
1
Excavate Channel
as directed
374
375
373
380
390
395
400
405
Compacted
Item
Embankment
No. 9
Rip-Rap
Item No. 10
Rip-Rap
Drain Well
Top Headwalls
Walls El. 377.5
15°-30'
375
377

2

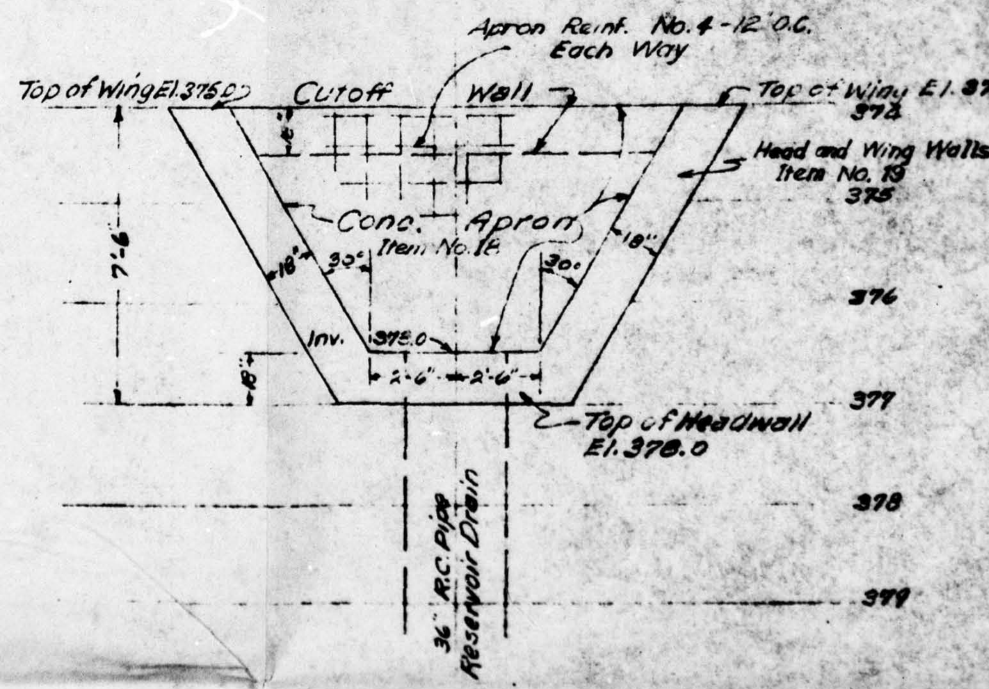


Rip-Rap
Item No. 16
Upstream Apron
Elev. 392.0
Spillway Crest - 50'
El 390.0
Elev 379.0
El 378.92
24°-30'
3+38
El 381.00
Elev. 372.75
Apron Item No 18
Spillway Channel
10' Berm El 381.00
Grade Level with Top of Wall
Grade Level with Top of Wall
375
380
385
390
395
400

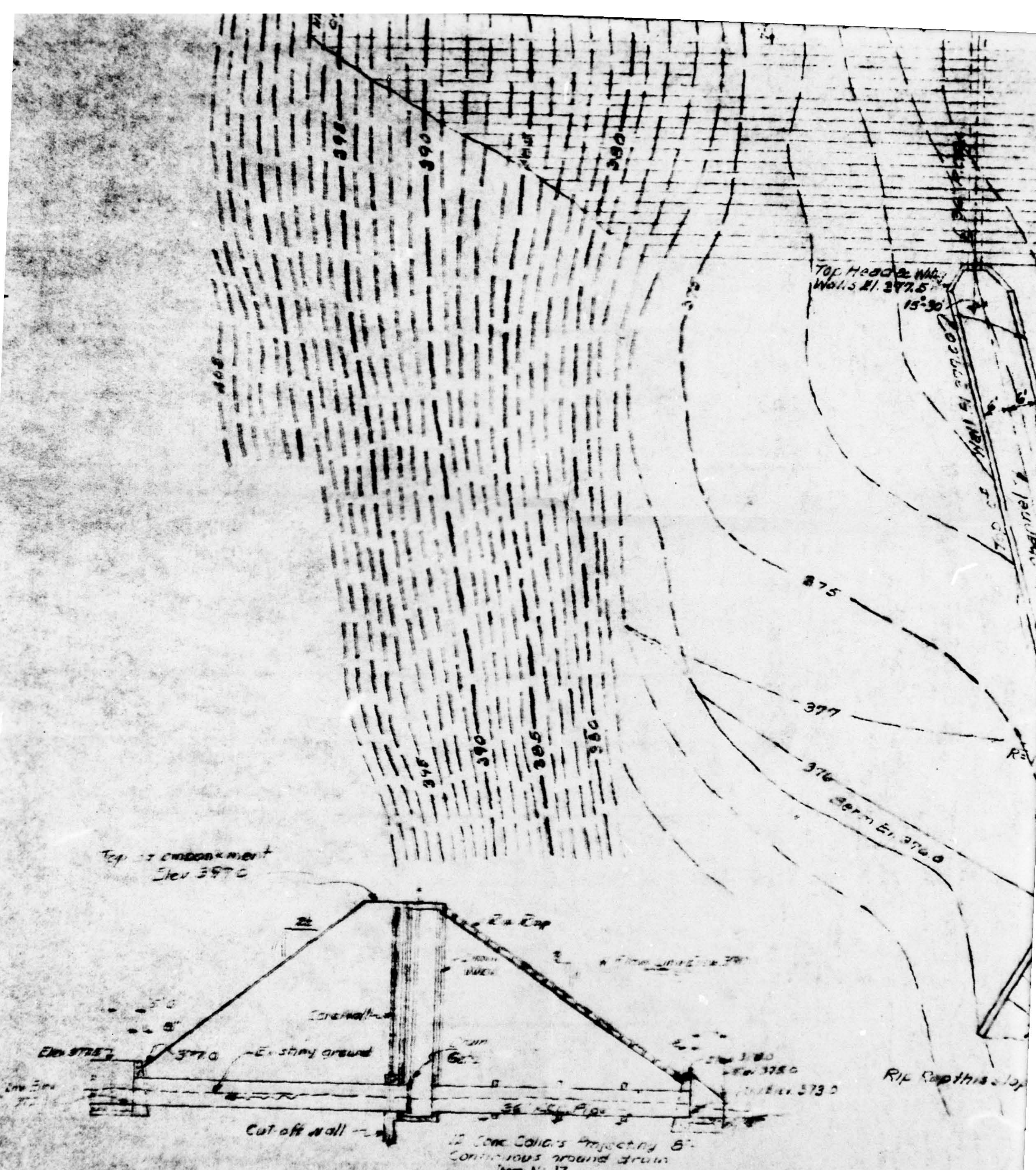
3



DETAIL OF RESERVOIR DRAIN
OUTLET STRUCTURE
Scale: 1/4" = 1'-0"

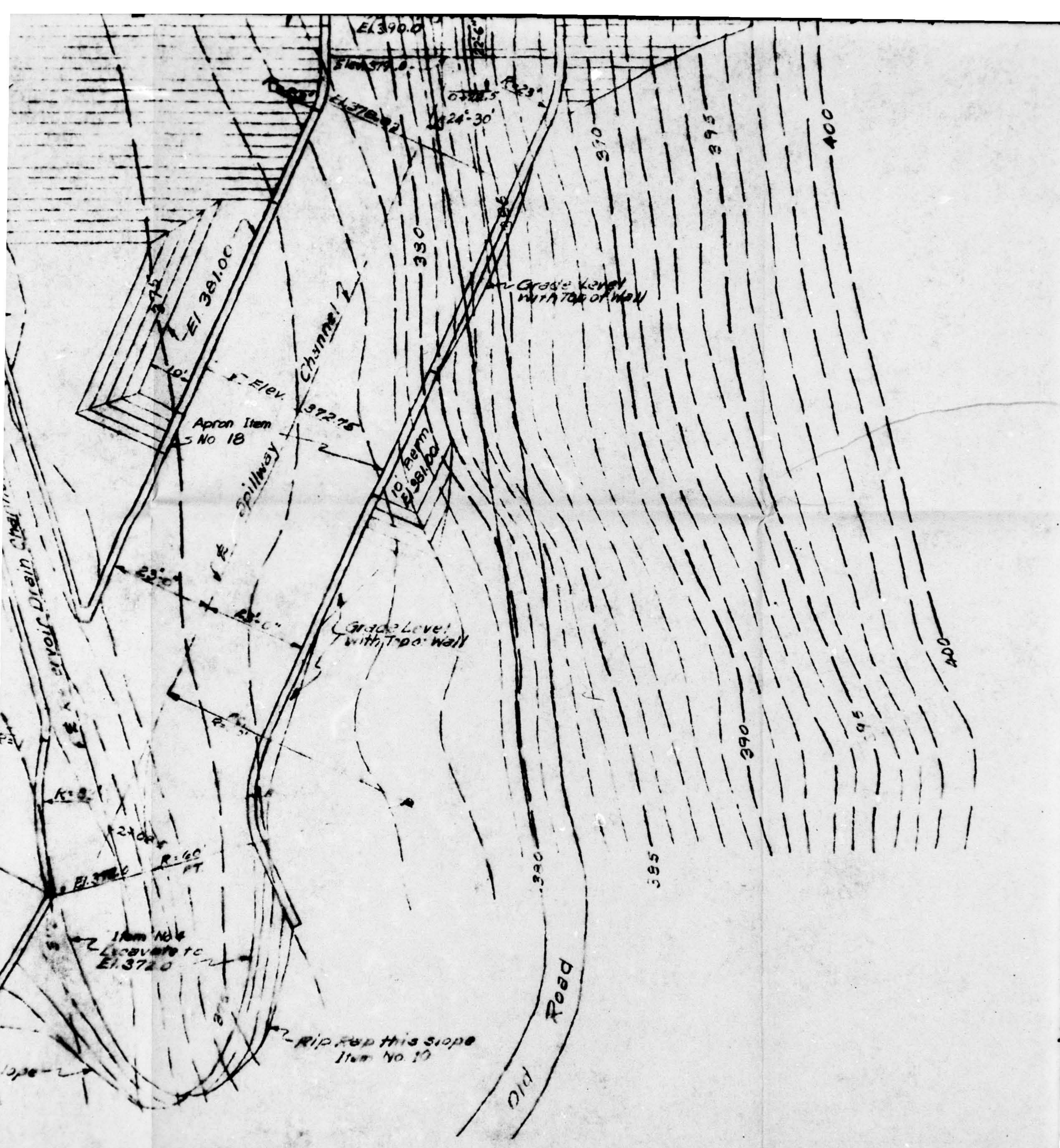


DETAIL OF RESERVOIR DRAIN
INLET STRUCTURE
Scale: 1/4" = 1'-0"



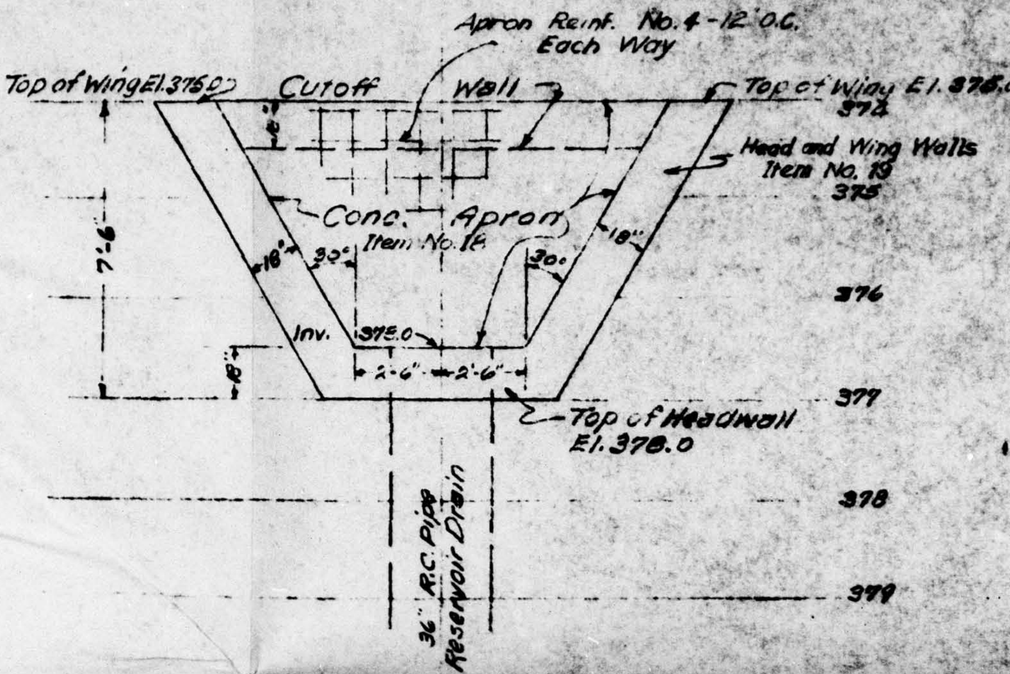
CROSS SECTION OF DAM AT RESERVOIR DRAIN

Scales
Horiz. 1" = 20'
Vert. 1" = 10'



PLAN
Scale 1" = 20'-0"

5



DETAIL OF RESERVOIR DRAIN
INLET STRUCTURE
Scale: 1/2" = 1'-0"

WATER DISTRICT No. 1
TOWN OF BETHLEHEM, NEW YORK
IMPROVEMENTS TO WATER SUPPLY SYSTEM
CONTRACT No. 4
VLY RESERVOIR DAM
GENERAL PLAN

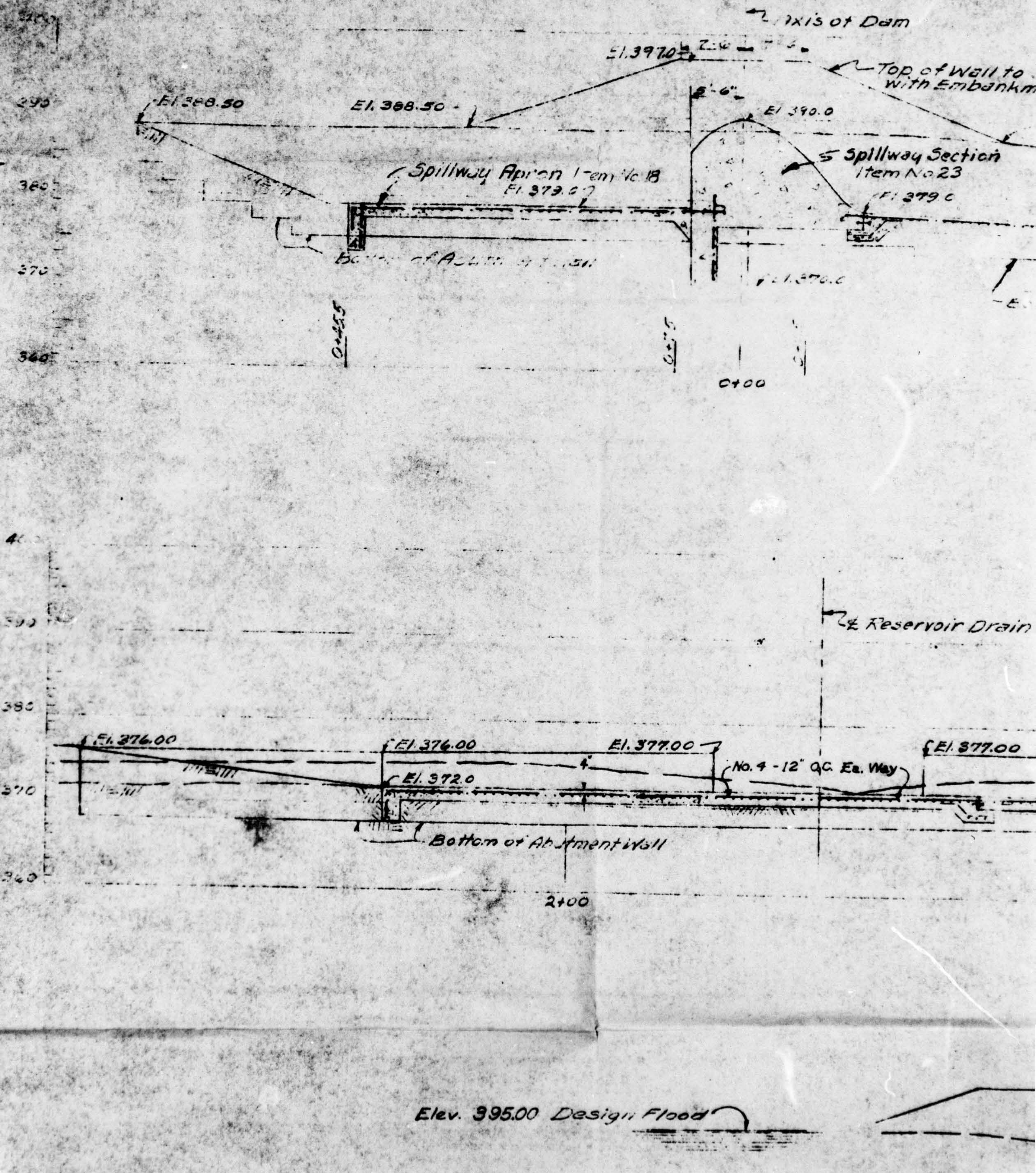
BENJAMIN L. SMITH & ASSOCIATES
CONSULTING ENGINEERS

6

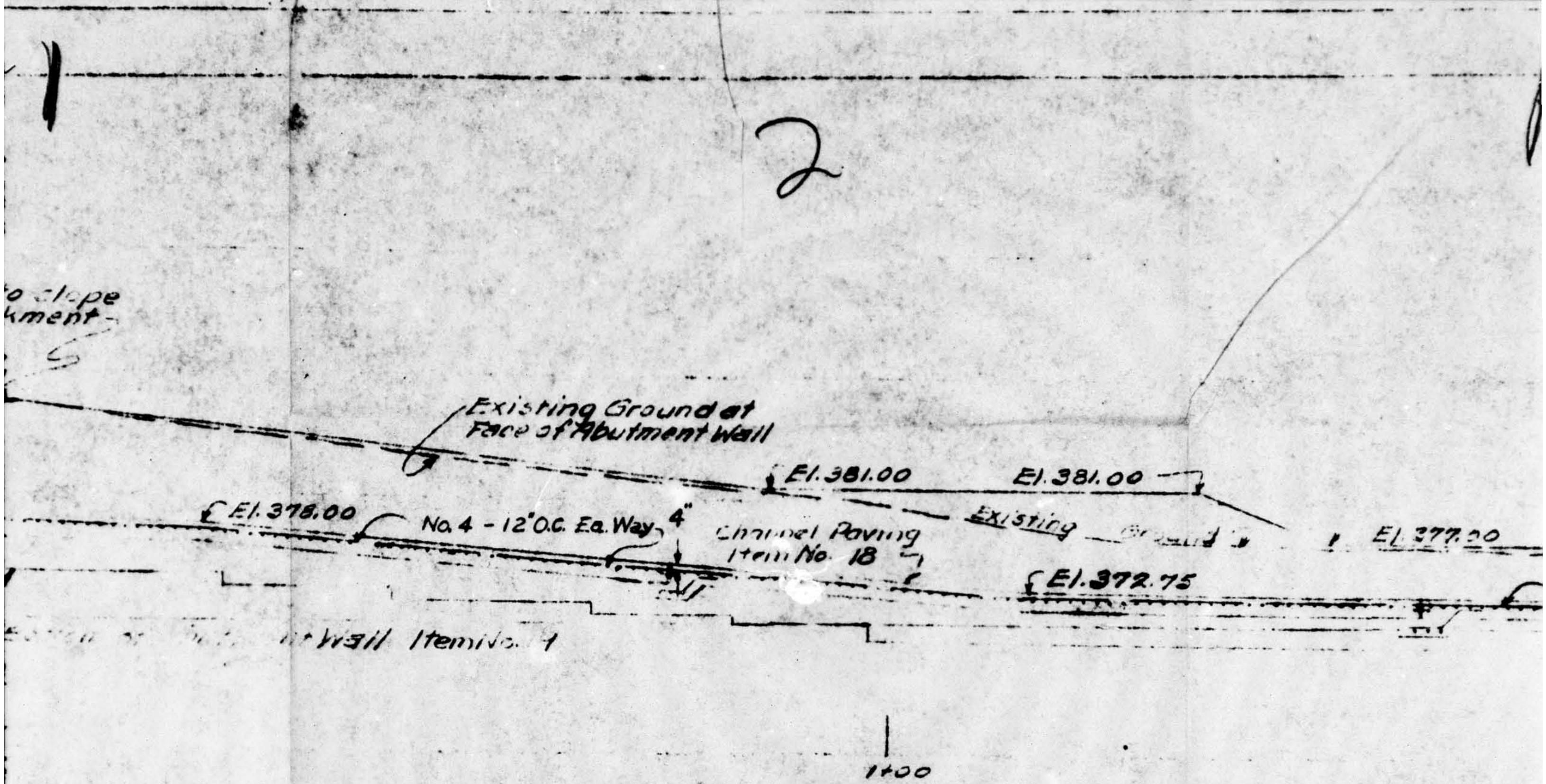
ALBANY, N.Y.
SEPT., 1955

SCALES AS SHOWN

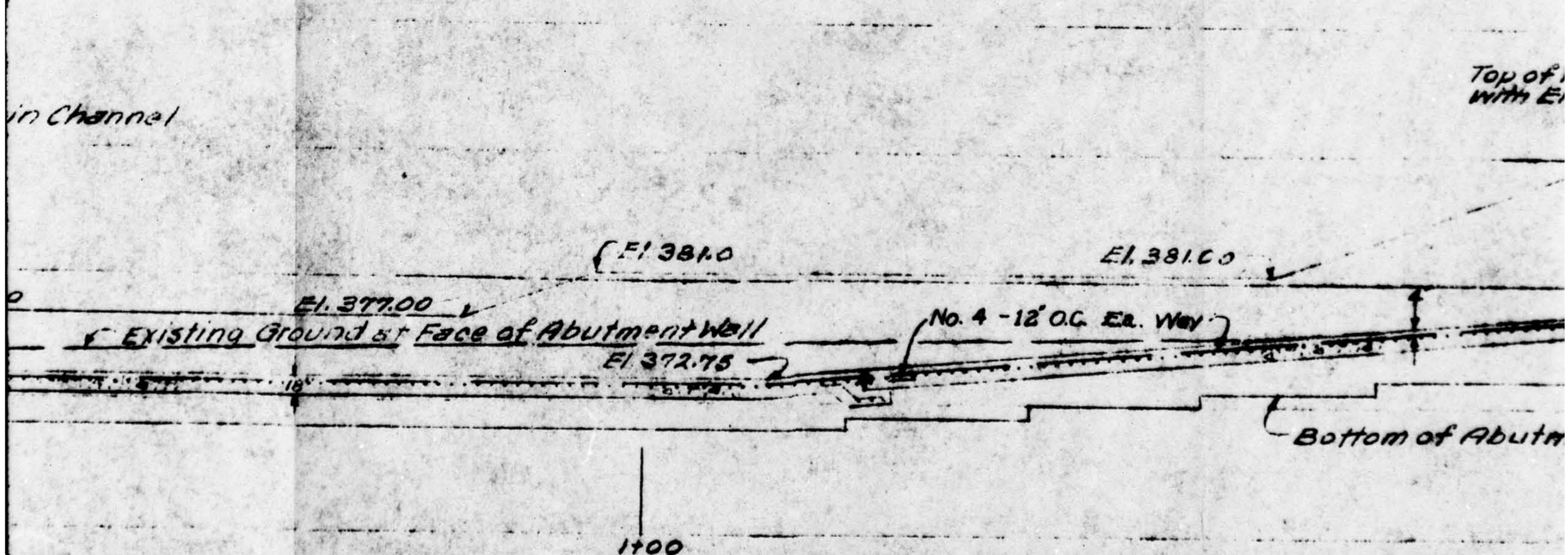
1



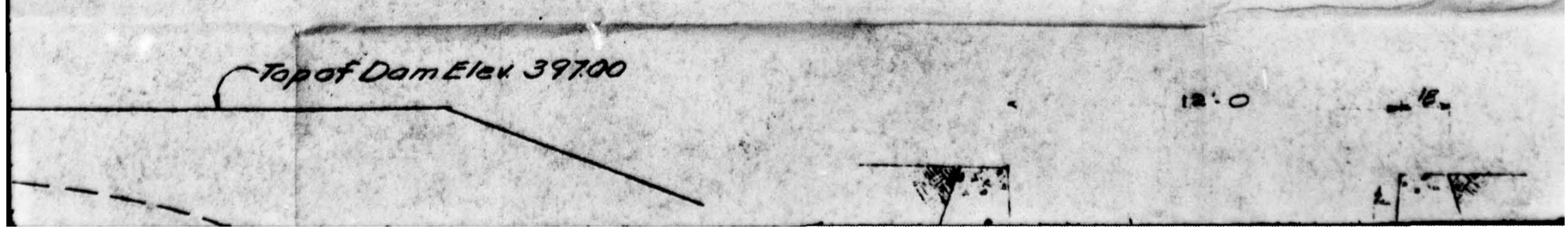
Axis of Dam
El. 397.0
Top of Wall to
with Embankm
El. 388.50
El. 388.50
El. 390.0
Spillway Section
Item No. 23
Spillway Apron Item No. 18
El. 379.0
El. 379.0
Bottom of Abutment
0+00
¢ Reservoir Drain
El. 376.00
El. 376.00
El. 377.00
El. 377.00
El. 372.0
No. 4 - 12" O.C. Ea. Way
Bottom of Abutment Wall
2+00
Elev. 395.00 Design Flood

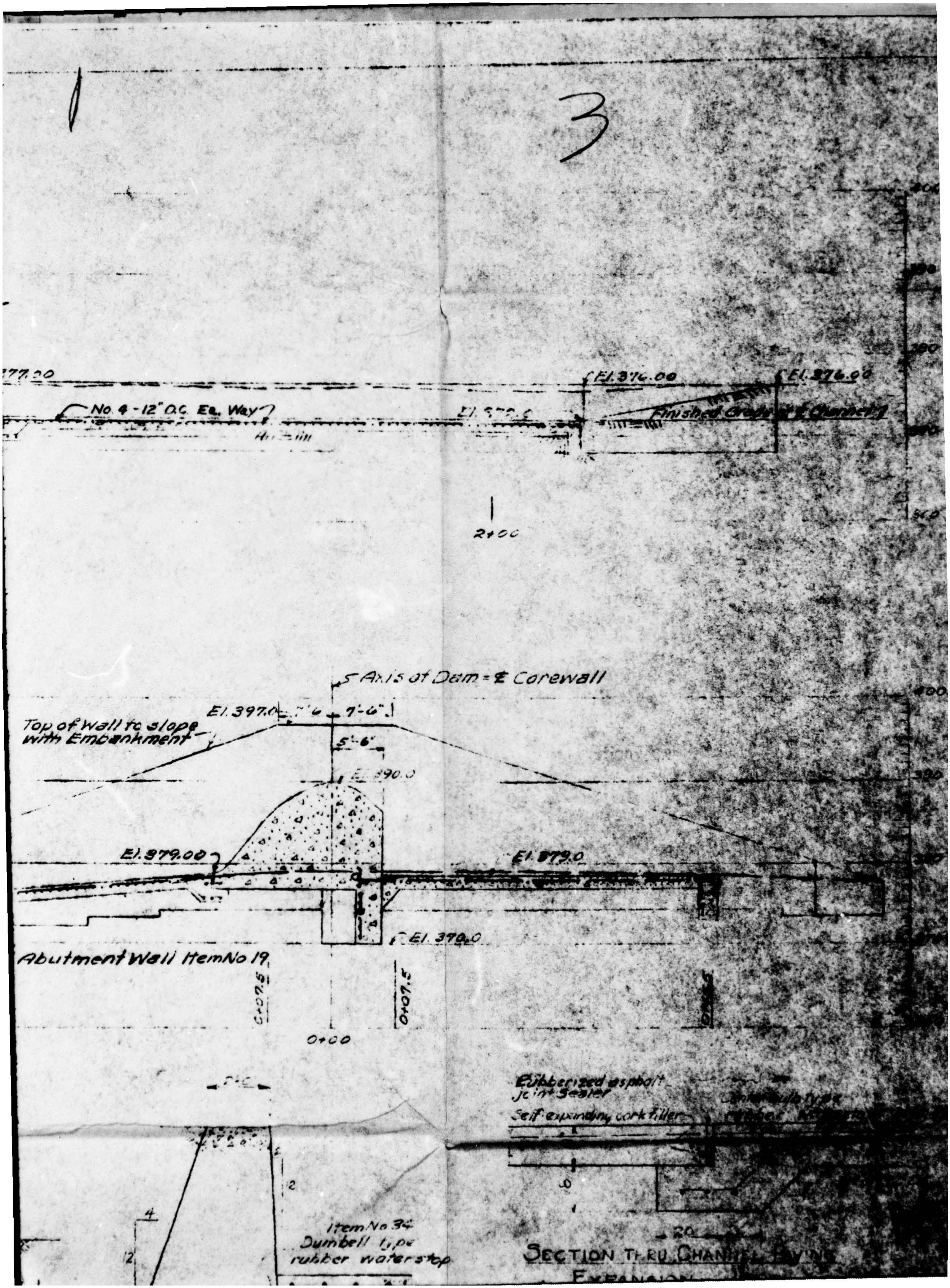


ELEVATION OF EAST ABUTMENT WALL
(LOOKING EAST)
Scale 1" = 10'

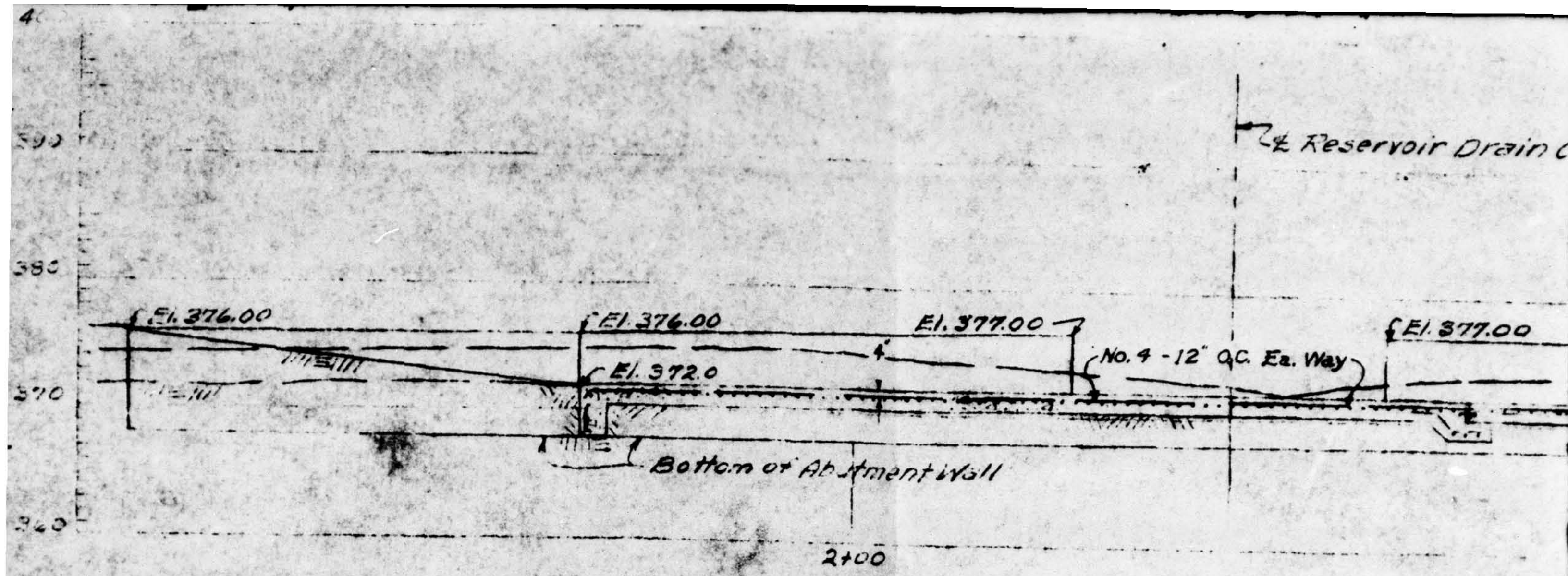


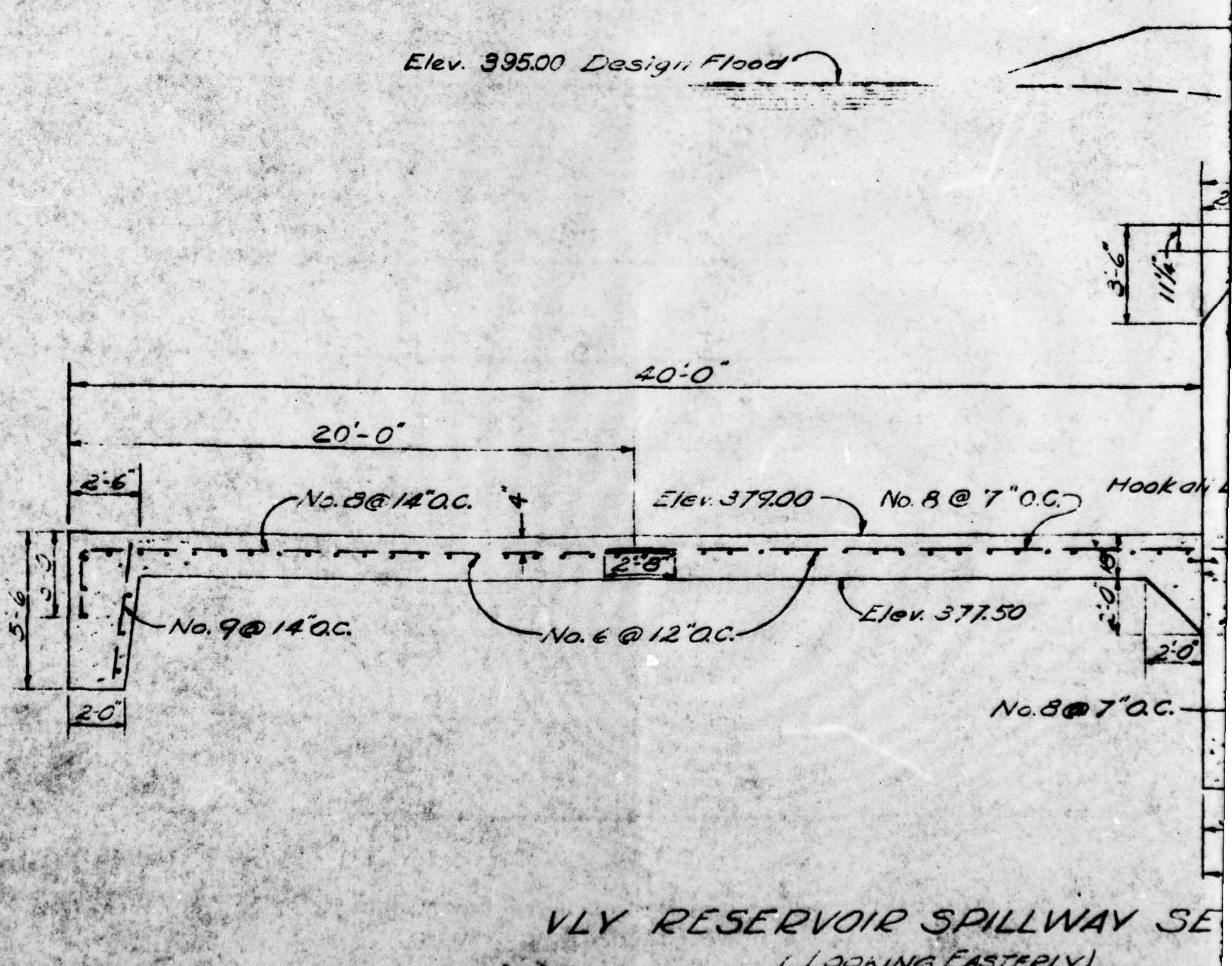
ELEVATION OF WEST ABUTMENT WALL
(LOOKING WEST)
Scale 1"-10'





1
3
No. 4 - 12" O.C. Ea. Way
El. 376.00
El. 376.00
Finished Grade of ℄ Channel
2+00
Axis of Dam = ℄ Corewall
El. 397.0
7'-6"
5'-6"
Top of Wall to slope with Embankment
El. 390.0
El. 379.00
El. 379.0
El. 370.0
Abutment Wall Item No 19
0+07.5
0+07.5
0+00
Rubberized asphalt joint sealer
Self-expanding cork filler
Item No 34 Dumbell type rubber waterstop
SECTION THRU CHANNEL PAVING

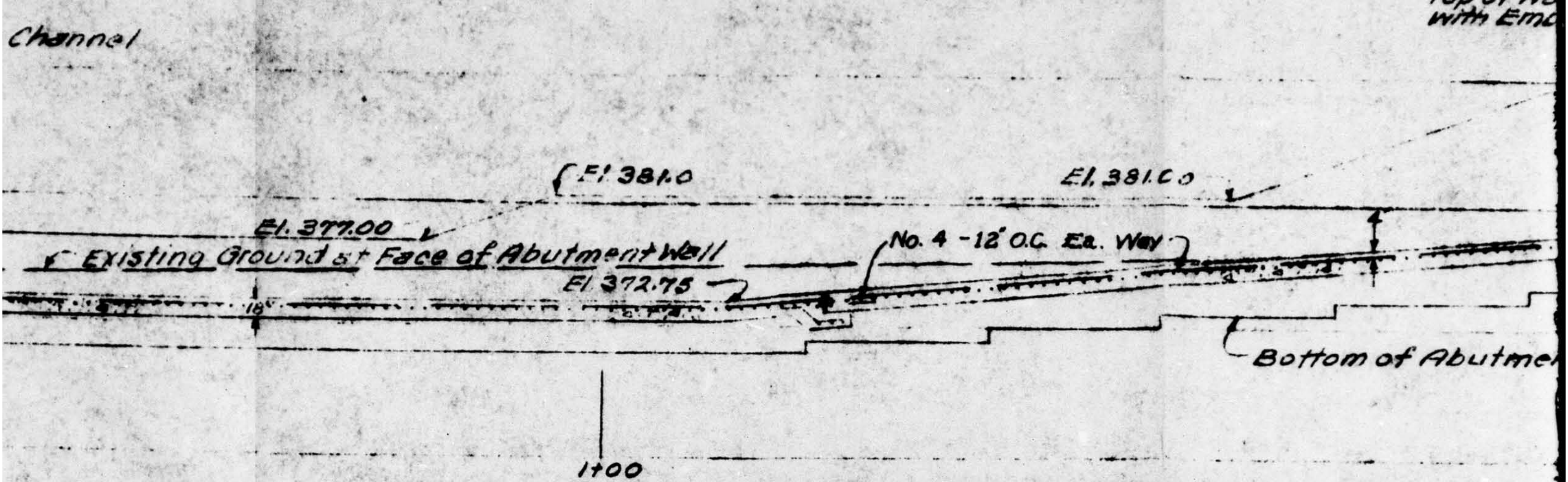




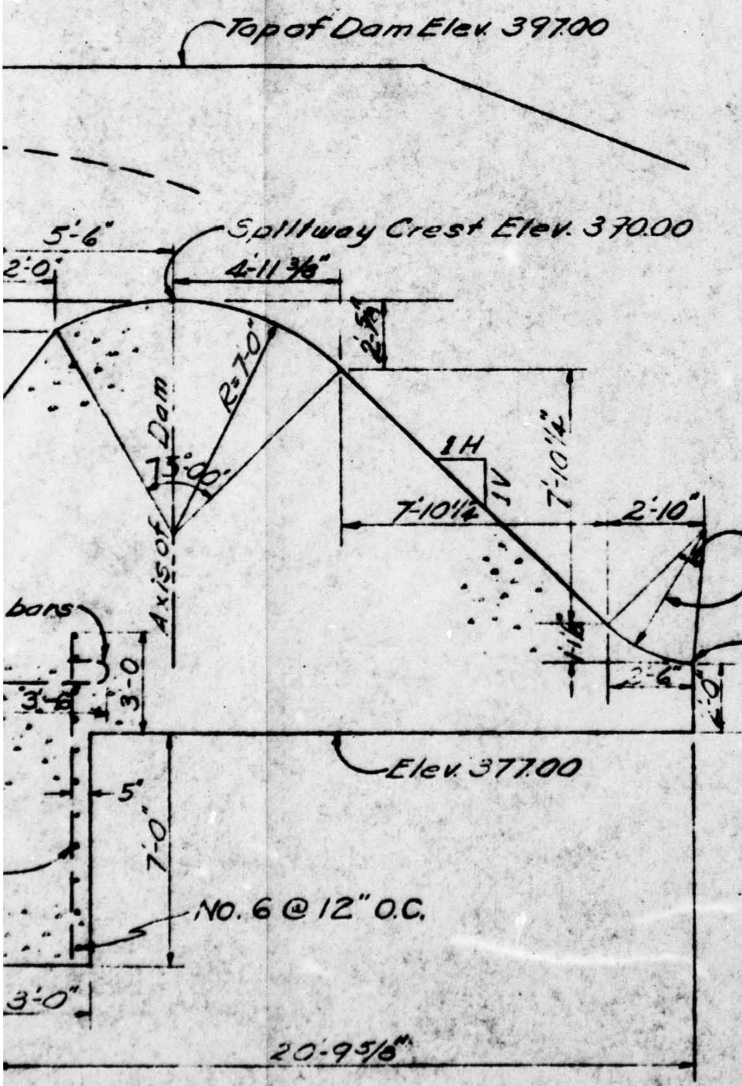
VLY RESERVOIR SPILLWAY SE

(LOOKING EASTERLY)

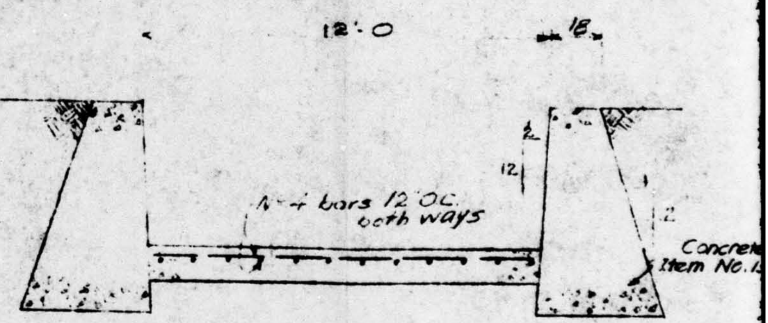
Scale: ¼" = 1'-0"



ELEVATION OF WEST ABUTMENT WALL
(LOOKING WEST)
Scale 1"-10'

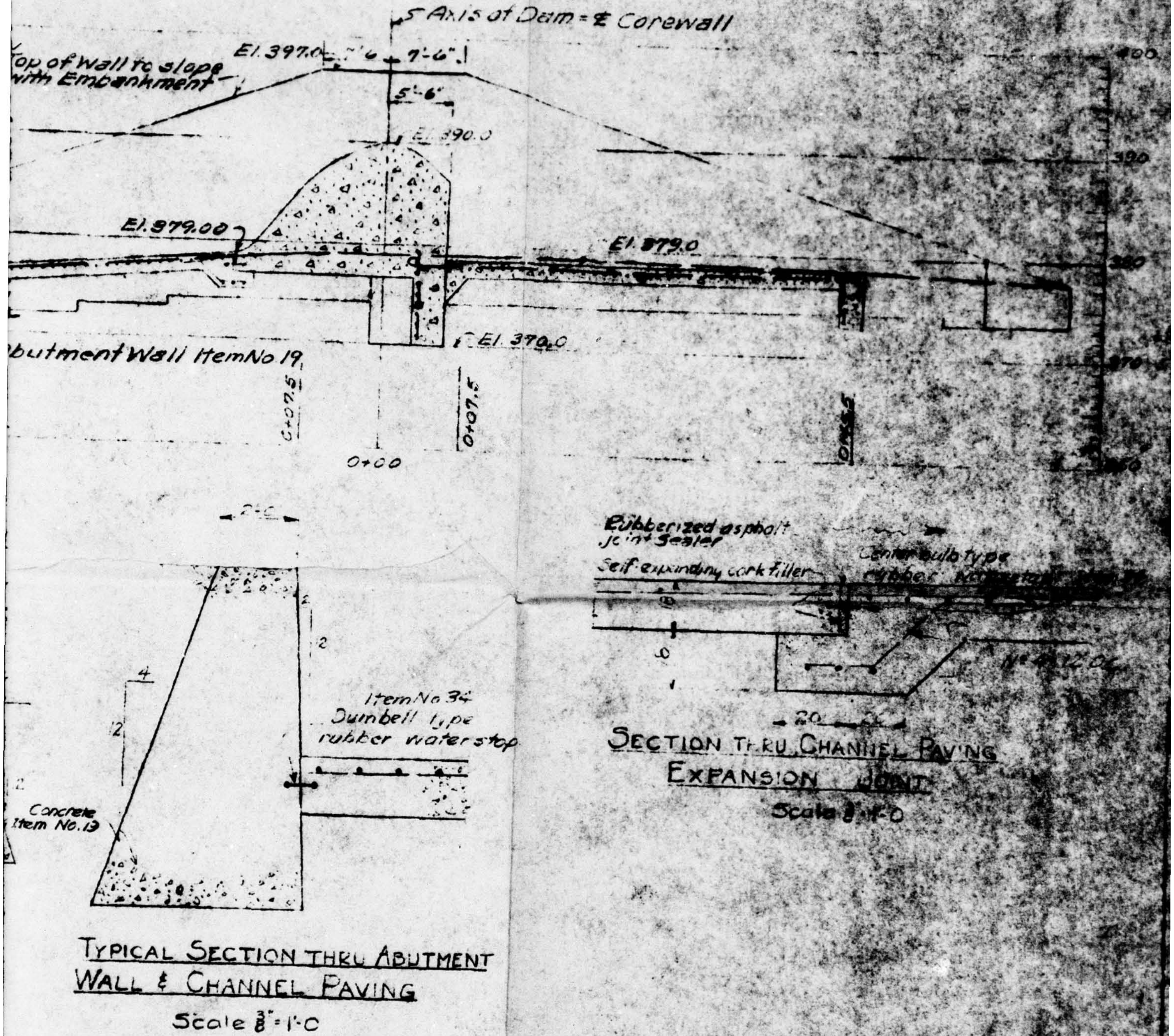


CTION



TYPICAL SECTION THRU
DRAIN CHANNEL
Scale 1"-1'-0

5



WATER DISTRICT No. 1

TOWN OF BETHLEHEM, NEW YORK

IMPROVEMENTS TO WATER SUPPLY SYSTEM

CONTRACT No. 4

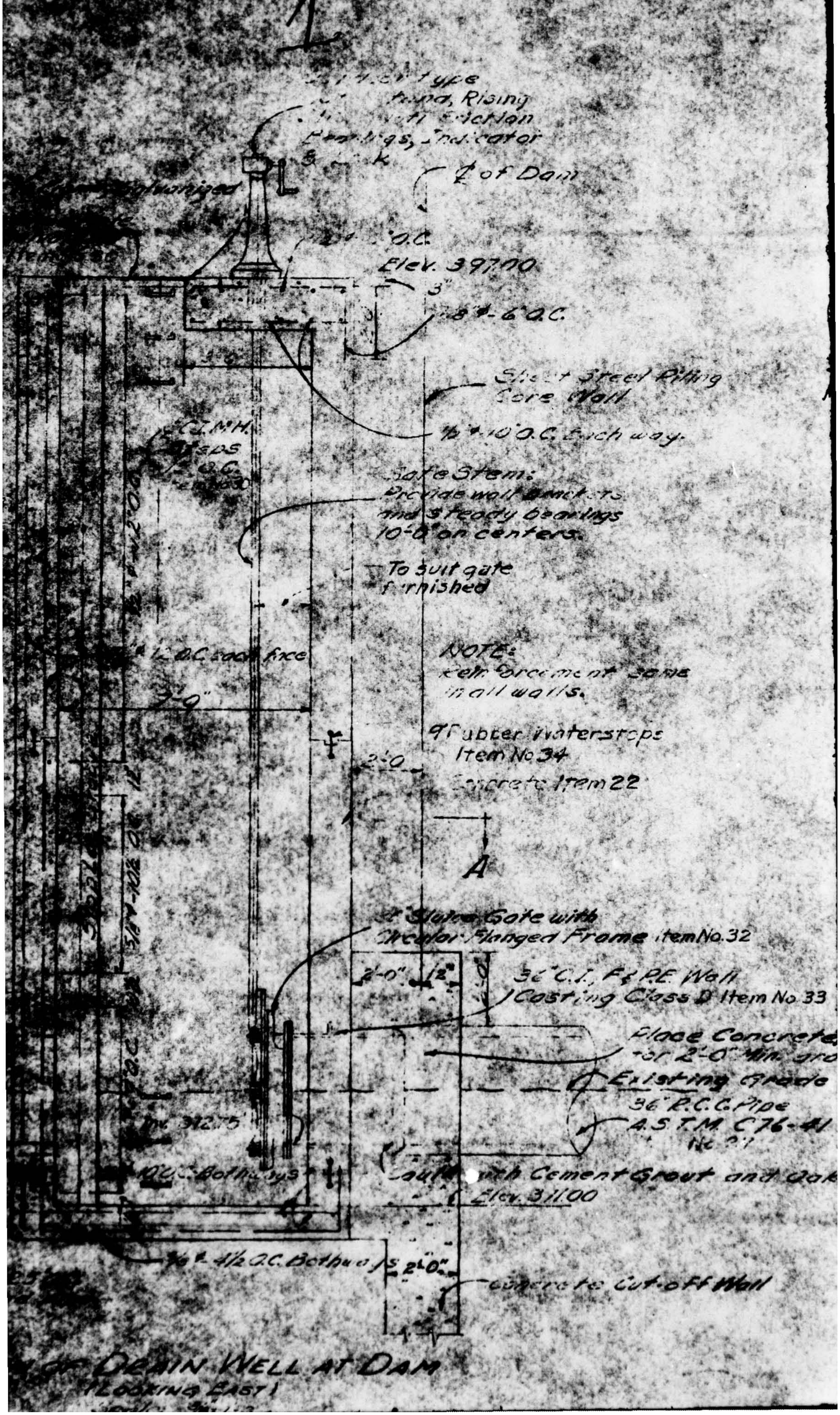
VLY RESERVOIR DAM

SPILLWAY SECTION & ABUTMENT WALLS

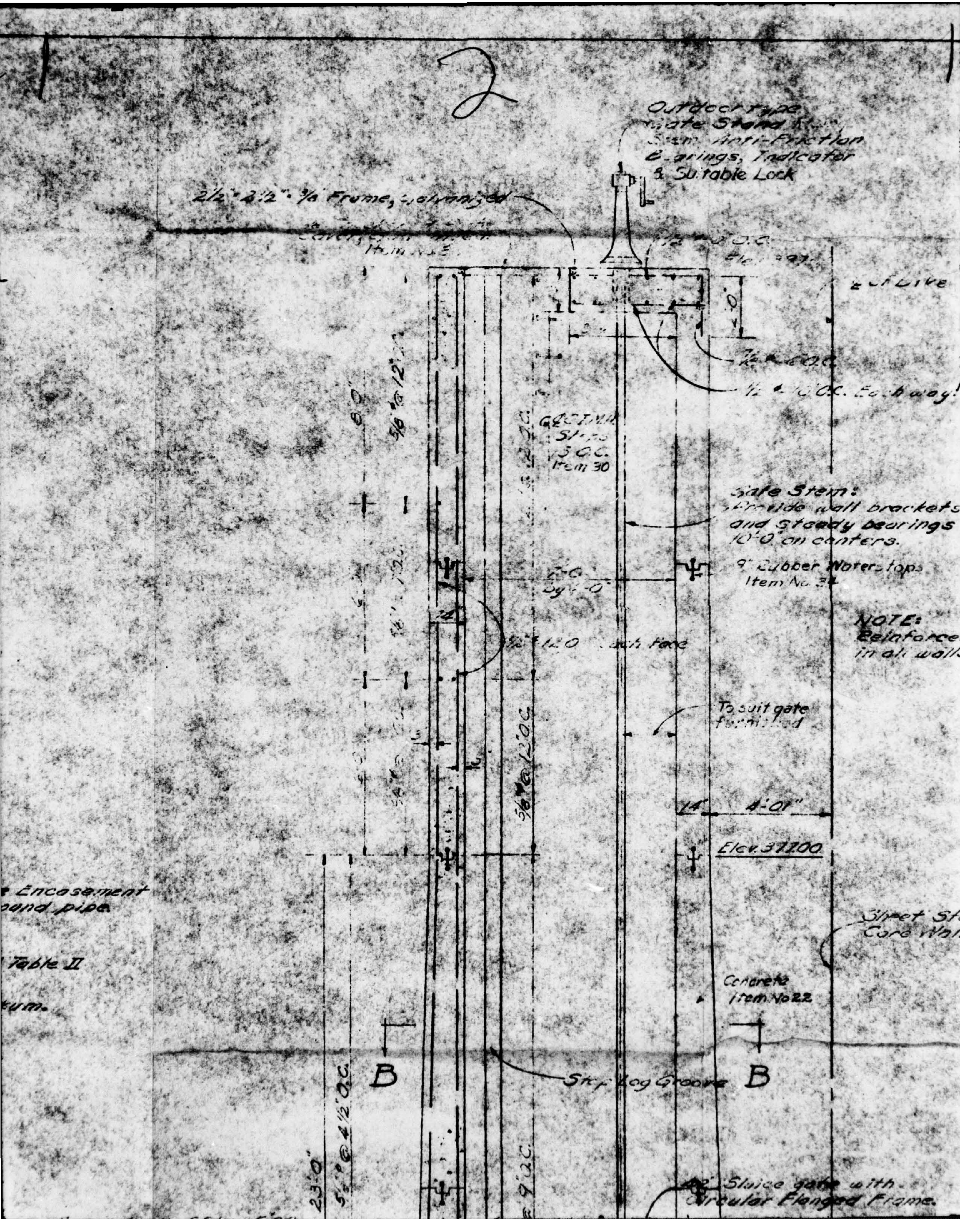
BENJAMIN L. SMITH & ASSOCIATES

CONSULTING ENGINEERS

6



1
Hand, Rising
Bearings, Indicator
℄ of Dam
Elev. 397.00
3"
Sheet Steel Piling
Core Wall
10'-0" O.C. Each way.
C.I.M.H. Steps
Gate Stem:
Provide wall brackets
and steady bearings
10'-0" on centers.
To suit gate
furnished
O.C. each face
NOTE:
Reinforcement same
in all walls.
Rubber Waterstops
Item No 34
2'-0"
Concrete Item 22
A
Sluice Gate with
Circular Flanged Frame Item No. 32
2'-0"
12"
36" C.I., F & P.E. Wall
Casting Class D Item No. 33
Place Concrete
Existing Grade
36" R.C.C. Pipe
A.S.T.M. C76-41
Caulk with Cement Grout and Oak
Elev. 311.00
O.C. Both ways
4½ O.C. Both ways
2'-0"
Concrete Cut-off Wall
DRAIN WELL AT DAM
(LOOKING EAST)



Outdoor type Gate Stand
Stem Anti-Friction Bearings, Indicator & Suitable Lock
2 1/2" × 2 1/2" × 3/8" Frame, galvanized
Item No. 3
1/2" @ 10" O.C. Each way
Gate Stem: Provide wall brackets and steady bearings 10'-0" on centers.
9" Rubber Waterstops Item No. 34
Item 30
NOTE: Reinforce in all walls
To suit gate furnished
4'-0 1/2"
Elev. 377.00
Encasement
Table II
Concrete Item No. 22
B
Stop Log Groove
B
Sluice gate with Circular Flanged Frame.
23'-0"

3

...tion
...tor

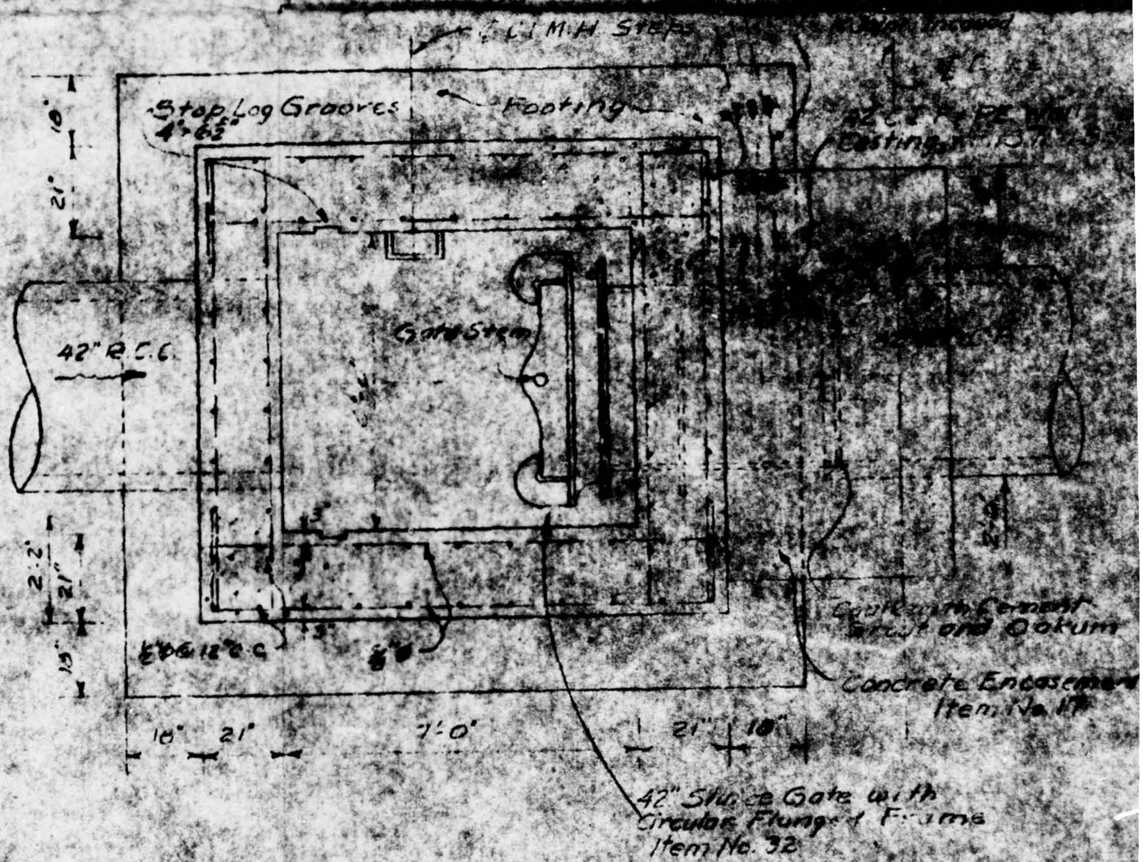
E of Dike

...C. Each way.

...m:
...wall brackets
...ady bearings
...enters.

Waterstops

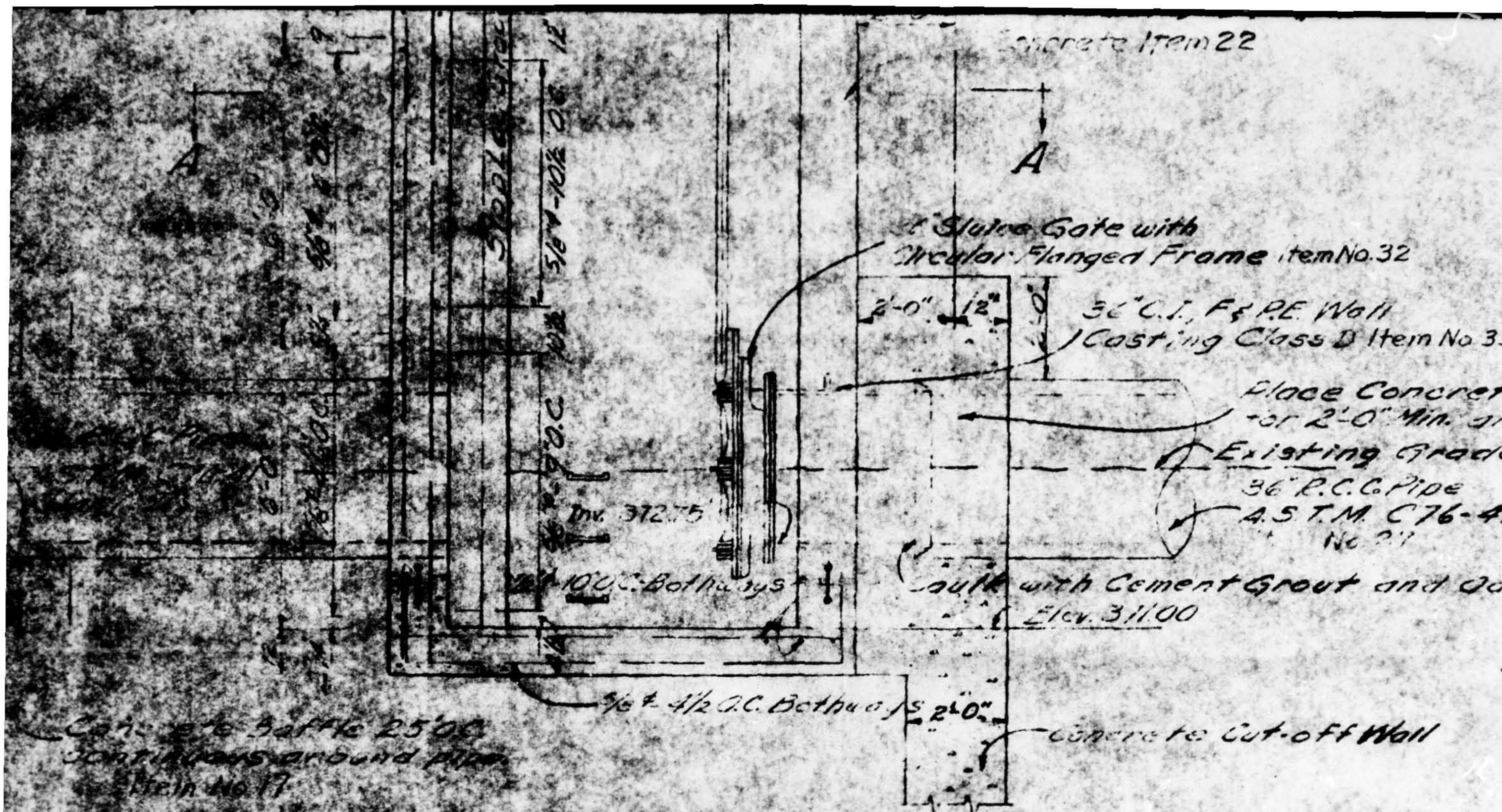
NOTE:
Reinforcement same in all walls.



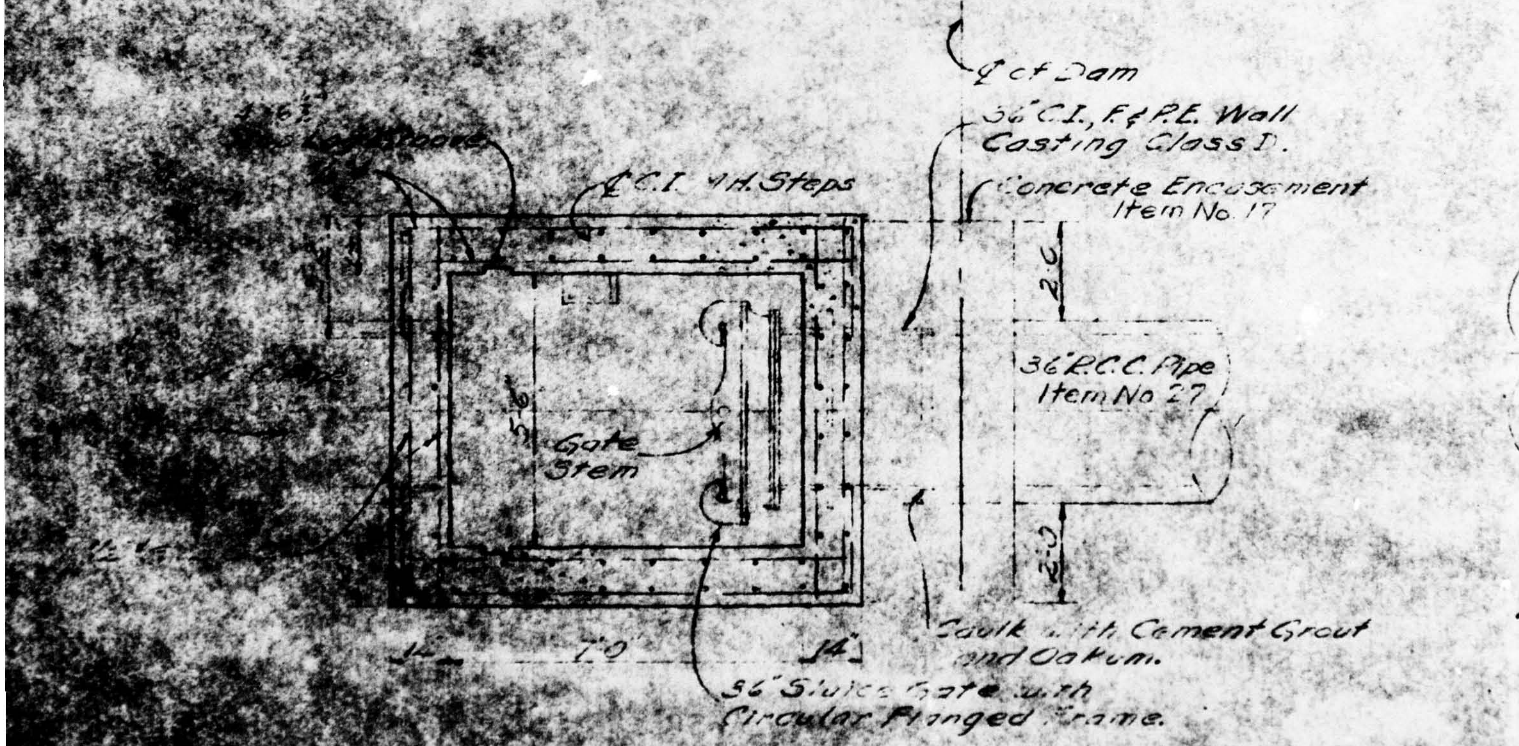
SECTION B-B
Scale: $\frac{3}{8}$" = 1'-0"

Sheet Steel Piling Core Wall.

...e with

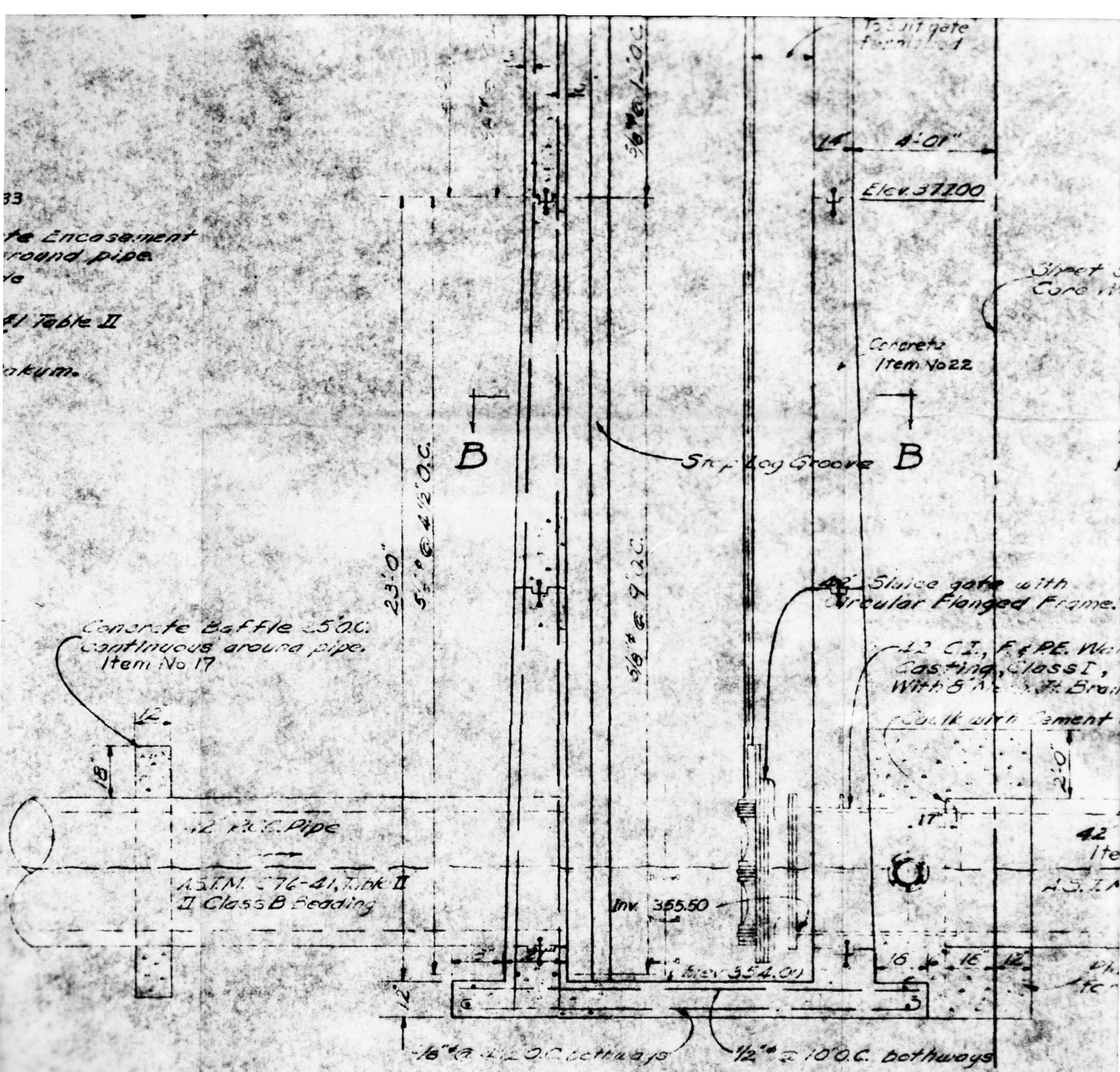


SECTION OF DRAIN WELL AT DAM
(LOOKING EAST)
Scale: 3/8"=1'-0"



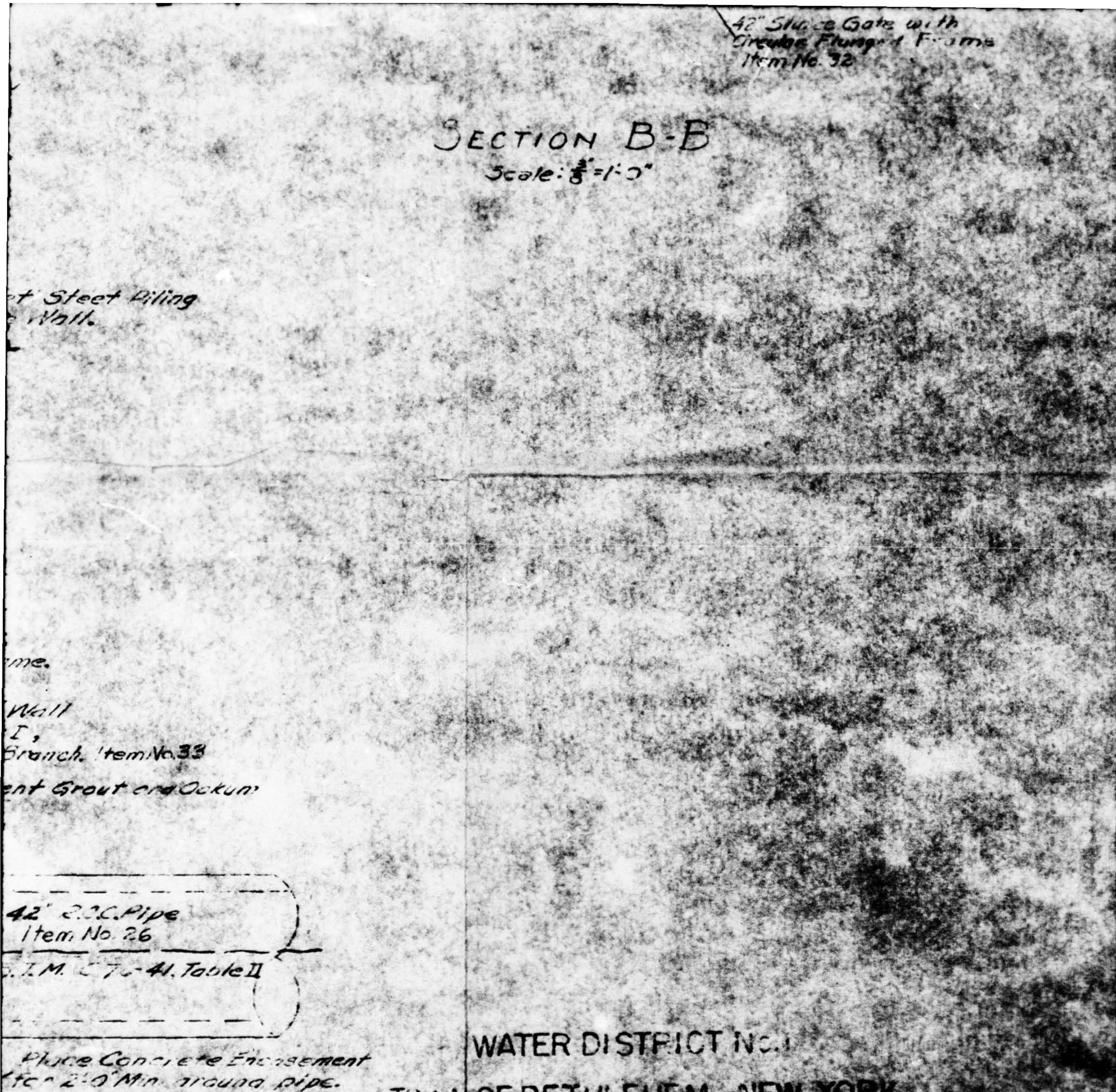
SECTION A-A
Scale 3/8"=1'-0"

4



SECTION OF DRAIN WELL AT DIKE

Scale [illegible]



WATER DISTRICT No.

TOWN OF BETHLEHEM, NEW YORK

IMPROVEMENTS TO WATER SUPPLY SYSTEM

CONTRACT No. 4

VLY CREEK RESERVOIR

RESERVOIR DRAIN WELLS

BENJAMIN L. SMITH & ASSOCIATES

CONSULTING ENGINEERS

6

SCALE 3/8

SEPT

SHEET 10

Sliding Analysis

Frictional Resistance as computed by consultant on sheet No. 13 of 40 indicates that 10,130 # is the design value. However a mathmatical error was found in this computation, the result being that the frictional resistance (design) is 101,370 #. Continuing with that analysis:

Resistance:	4412	P_G
	5915	P_S
	24,000	cohesion
	101,370	friction
	135,697	Total

using ice thrust of 10,00 psf sliding forces = 23,580 #

$$\text{Factor of Safety sliding} = \frac{135,697}{23,580} = \underline{\underline{5.75}}$$

Vly Creek DAM

Sliding Analysis

A more reasonable analysis is as follows:
(based on current design practices)

From Navdocks Table 10-1

Concrete on Soil : Clayey Gravel $\tan \delta = .5$ $c = 0$

Frictional Resistance = $\frac{36,900}{.5}$ = 73,800#

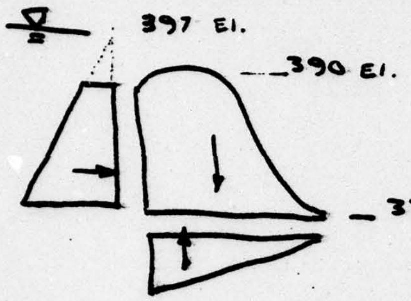
Resistance	4,412	P_c
	5,915	P_s
	0	Cohesive
	73,800	Frictional
	84,127	Total

Factor of Safety sliding = $\frac{84,127}{23,580}$ = 3.56

assuming 10,000 psf ice thrust

Vly Creek DAM

Overturning Analysis



Taking moments about heel

Water $62.4 \left(\frac{7+20}{2} \right) 13 \times 6 = +65{,}700$ '#

Weight of DAM : From consultant computations Page 23 of 40 $= +209{,}500$ '#

Uplift : $62.4 \left(\frac{1}{2}\right) 20 (20) \frac{20}{3} = -83{,}200$ '#

Total 192,000 '#

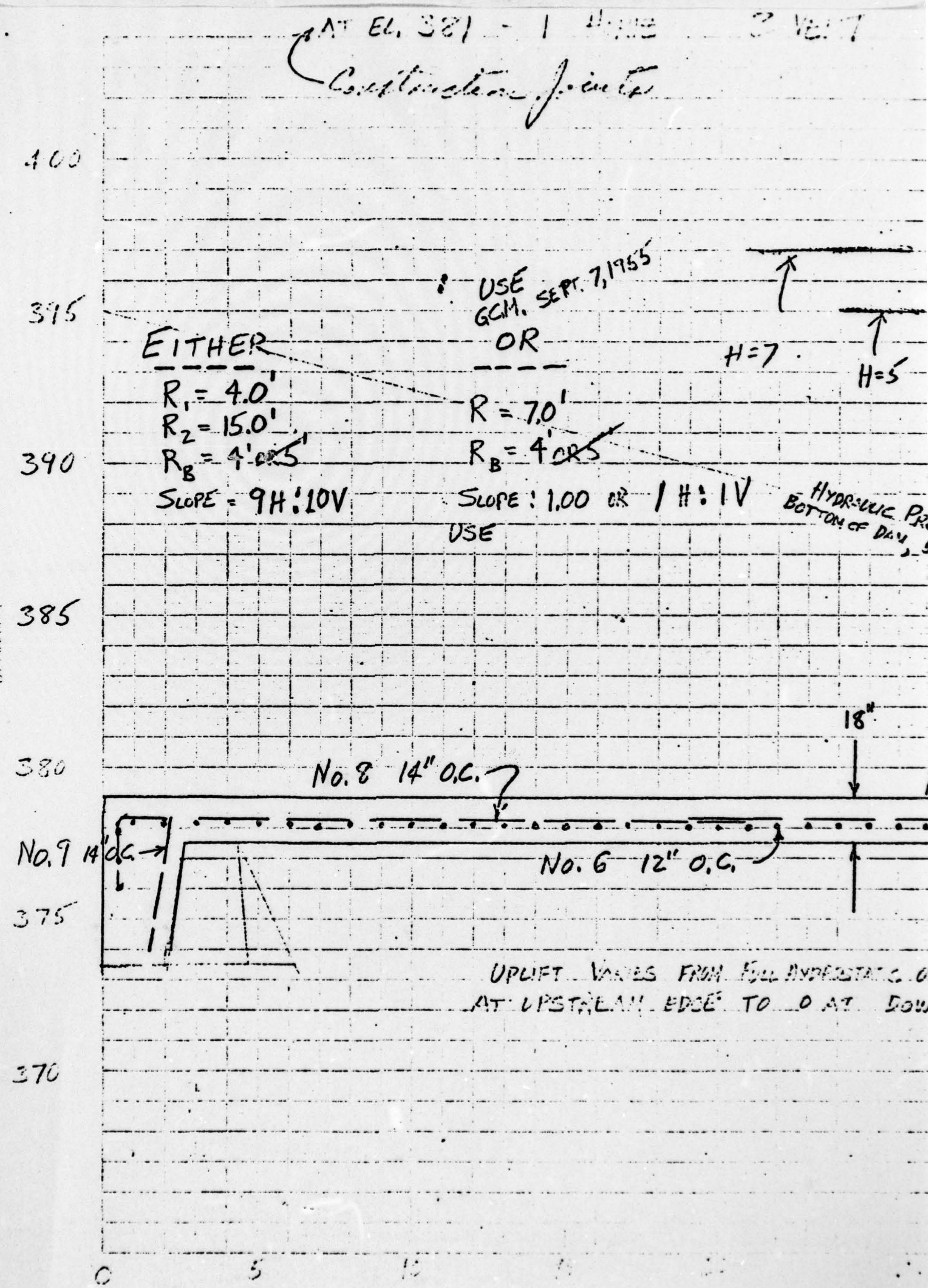
Weight of DAM	26,600
uplift	12,480
Net weight	14,120

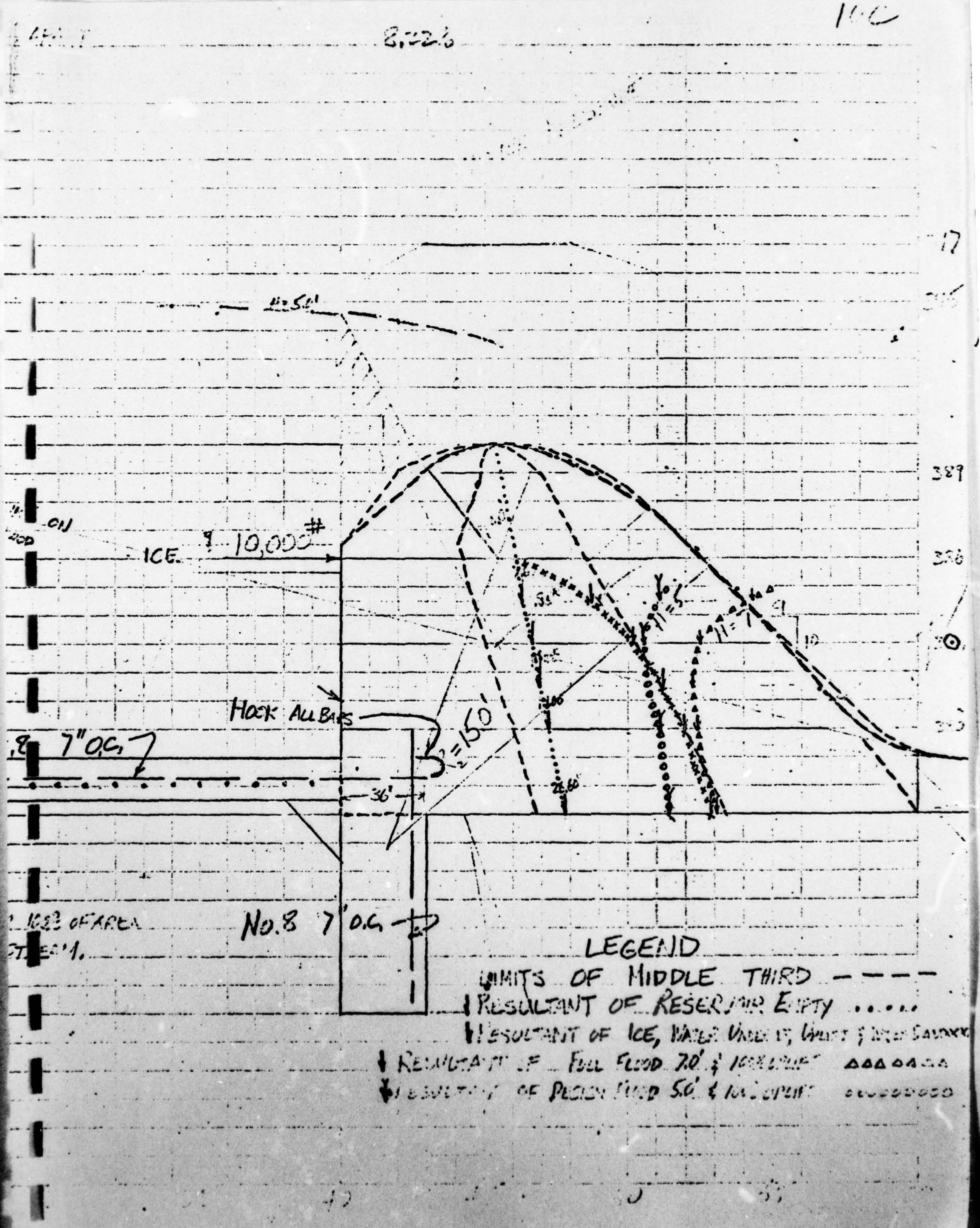
Resultant of Forces $= \frac{192{,}000\text{'\#}}{14{,}120\text{\#}} = 13.6$ feet

Resultant is at limit of middle 1/3

Sheet # 16 of 40 shows factor of safety for worst condition with ice load

$F.S._{\text{overturning}} = 1.85$


AT EL. 381 - 1 HORIZ. 3 VERT
Contraction joints
400
395
390
385
380
375
370
0
5
10
USE
GCM. SEPT. 7, 1955
EITHER
OR
$R_1 = 4.0'$
$R_2 = 15.0'$
$R_B = 4'$ ~~OR 5'~~
SLOPE = 9H:10V
$R = 7.0'$
$R_B = 4'$ ~~OR 5~~
SLOPE : 1.00 OR 1H:1V
USE
H=7
H=5
HYDRAULIC PR
BOTTOM OF DAM
18"
No. 8 14" O.C.
No. 9 14" O.C.
No. 6 12" O.C.
UPLIFT VARIES FROM FULL HYDROSTATIC
AT UPSTREAM EDGE TO 0 AT DOW


ICE 10,000#
HOOK ALL BARS
7" O.C.
36'
No.8 7' O.C.
LEGEND
LIMITS OF MIDDLE THIRD
RESULTANT OF RESERVOIR EMPTY
RESULTANT OF ICE, WATER UNDER IT, UPLIFT
RESULTANT OF FULL FLOOD 7.0'
RESULTANT OF DESIGN FLOOD 5.0'

BENJAMIN L. SMITH & ASSOCIATES
ENGINEERS

COMPUTED BY [illegible] SUBJECT SPILLWAY DAM SECTION SHEET NO. 11 OF 40

CHECKED BY

DATE AUG 17, 19[illegible]

[illegible] THE SPILLWAY SECTION HAS BEEN [illegible] CHANGED WE CAN NOW TAKE ADVANTAGE OF THE [illegible] PRESSURES ON THE UPSTREAM [illegible] SURFACE OF THE DAM AND APRON. THIS ADDITIONAL NORMAL [illegible] [illegible] TEND TO OVERCOME THE UPLIFT [illegible]. THEREFORE [illegible] TOTAL LENGTH OF 60 INSTEAD OF 70'

28,200 #/FT RESISTANCE 2B. DEVELOPED BY COHESION & FRICTION

60×400 — 24,000 COHESIVE RESISTANCE

4,200 #/FT TO BE RESISTED BY FRICTION

624×60 — 37,440 # UPLIFT

11.5×23=[illegible]

1/2 11.5×20 = 115

374×62.0 — 23,400 # NORMAL FORCE DUE TO WATER

14,040 (DAM MUST WEIGH NOT TO FLOAT

$\frac{4,200}{.30}$ = 14,000 # (WT. OF DAM TO RESIST SLIDING)

DAM MUST BE ABOUT 15,000 #/FT. OF WIDTH

I DOUBT IF I CAN MAKE THE SECTION LIGHTER THAN SAY 30,000 # [illegible] FEET ∴ IT COULD BE SHORTENED, BUT THIS DOESN'T SEEM ADVISABLE AS IT WOULD SHORTEN THE LEAKAGE PATH UNDER THE SPILLWAY & MAKE IT THE MOST PROBABLE DANGER SPOT WITH RESPECT TO PIPING.

RECALCULATE THIS SECTION SHEET 10A

THRUST = $P_2 + P_3 + P_0 + P_7$

RESISTANCE = P_6 + COHESION + FRICTION + P_5 + P_4 .49

P_2 = 4,170 #

P_3 = 11,[illegible] #

P_0 = 5,400 # 55×5.5 .49 — ASSUME [illegible]

P_7 = 4,010 #

28,5[illegible] # THRUST

BENJAMIN L. SMITH & ASSOCIATES
ENGINEERS

COMPUTED BY NELSON TYRREL SUBJECT VLY RESERVOIR DAM SHEET NO. 12 OF 40

SPILLWAY SECTION

CHECKED BY

DATE AUG 18, 1955

RESISTANCE

$P_6 = 4,412^{\#}$

12.5 × 62.4 = 780
16.5 × 62.4 = 1,030
+ .55 × 4 × 2.03 = 446 = 1,476
$\frac{1476 + 780}{2} \times 1$
$\frac{2,256}{2}$ 1128 × 1 = 1,412#

COHESIVE RESISTANCE
400#/ft² × 60 = 24,000#

$P_5 = 5,915^{\#}$

3.75 × 62.4 = 234
10.75 × 62.4 = 672
+ .55 × 7 × 2.03 = 783

FRICTIONAL

UPLIFT
12.75 × 2 25.5
14.5 × 1 = 14.5
$\frac{4.3 + 12.3}{2} \times 44' = 365.2$
11 × 3' = 36.0
$\frac{3.75 + 2.0}{2} \times 10 = 28.8$
4700 × 62.4 = 29,300#

WT. WATER
11.5 × 42 453
10.5 × 2 21
5.0 × 1 = 5
509 ft² × 62.4 = 31,800#

WT. OF DAM
5.5 × 2 = 11.0
3.5 × 1 = 3.5
1.5 × 44 = 66
BY STEPPING = 155 ft²
235.5 × 144 = 34,400#

66,200
− 29,300
36,900# (NET FORCE)

BENJAMIN L. SMITH & ASSOCIATES
ENGINEERS

NELSON H. TUTTEL — SUBJECT VLY RESERVOIR DAM — SHEET NO. 13 OF 40
COMPUTED BY

SPILLWAY SECTION

CHECKED BY

AUG 19, 1955
DATE

WITH $\phi = 20^\circ$ $\tan \phi = .364$

FRICTIONAL RESISTANCE $\frac{36,700^{\#}}{.364} = 10,130^{\#}$

RESISTANCE

	$4,412^{\#}$	P_6
	5,915	P_5
	24,000	COHESIVE
	10,130	FRICTIONAL
	44,457	

$\frac{44,457}{28,580} = 1.55$ FACTOR OF SAFETY AGAINST SLIDING

IF ICE THRUST IS CONSIDERED $10,000^{\#}$ INSTEAD OF $15,000^{\#}$/FT. THE F.S. WOULD BE.

$\frac{44,457}{23,580} = 1.89$

I HAVE OMITTED P_4 AS DOWNSTREAM APRON WOULD PROBABLY BUCKLE AS IT IS THIN. 5 OR 10 THICKNESSES WOULD " ACT OR 7 x 7 x 400 OR 5000R $6,000^{\#}$

BENJAMIN L. SMITH & ASSOCIATES
ENGINEERS

COMPUTED BY | SUBJECT | SHEET NO. 14 OF 20

CHECKED BY
AUG 19, 1955

OVERTURNING & SOIL PRESSURE

ΣM_{TOE} ICE CONDITION WILL BE MORE SEVERE THAN FULL FLOOD

~~15,000~~ × ~~14.5~~ = ~~157,500~~'# (120,000; 12.0)

4120 × ($\frac{11.5}{2}$ + 15) = 21,950'#

WT. OF WATER — LEVER ARM

11.5 × 5 = 57.5 × 62.4 = 3590 × 20.5 = 73,700'#

10.5 × 2 = 21 × 62.4 = 1310 × 17.0 = 22,300'#

5 × 1 = 5 × 62.4 = 312 × 15.5 = 4,840'#

83.5 × 62.4 = 5212 — 100,740

CONCRETE — LEVER ARM — MOMENT

SQ. FT.

2.1 × 0.5 = 1.05
2.3 × 1.5 = 3.45
2.75 × 2.5 = 6.88
3.6 × 3.5 = 12.61
5.1 × 4.5 = 22.95
6.6 × 5.5 = 36.3
7.9 × 6.5 = 51.3
9.3 × 7.5 = 69.7
10.2 × 8.5 = 86.6
11.0 × 9.5 = 104.5
19.0 × 10.5 = 199.3
19.5 × 11.5 = 224.5
19.9 × 12.5 = 243.5
13 × 13.5 = 175.5
12.7 × 14.5 = 184.2
8.0 × 15.5 = 124.0
3.0 × 16.5 = 49.5
2.1 × 17.5 = 36.7
7.5 × 20.5 = 153.

UPLIFT — MOMENT

4.3 + 6.2

2.0 × 10 × 5 = 100
1.7 × 10 × 6.67 = 57
11 × 3 × 11.5 = 379
4.3 × 10 × 18 = 775
1.9 × 10 × 19.67 = 187

158
22
1498 × 62.4 = 93,000'#
273

USE 199

257,500'#

1716.16 × 62.4 = 1117 54136'#

OVERTURNING MOMENTS = 273,000'#
RIGHTING MOMENTS = 212,000'# ... = 1.3 ...

BENJAMIN L. SMITH & ASSOCIATES
ENGINEERS

COMPUTED BY: NELSON N. TYRSEL SUBJECT: VLY RESERVOIR DAM SHEET NO. 15 OF 40

SPILLWAY SECTION

CHECKED BY

DATE: AUG 22, 1956

OVERTURNING SEE 10B

TO IMPROVE STABILITY MOVE KEY OR CUT OFF WALL FURTHER UPSTREAM, (3.0') EXTEND UPSTREAM APRON EFFECTIVE IN ACTING WITH DAM (3.0') & LENGTHEN TOE TO LENGTHEN LEVER ARM. (2.0')

MOMENT OF WATER

11.5 × 8 = 92 × 62.4 = 5,740 × 24.0 = 137,500
10.5 × 2 = 21 × 62.4 = 1,310 × 19.0 = 24,900
5.0 × 1 = 5 × 62.4 = 312 × 17.5 = 5,460
167,860#
329,587
RIGHTING MOMENT 497,447#

CONCRETE MOMENT

+207.6	
2.3 × 8.75 = 20.1	2.0 × 0.5 = 1.0
2.75 × 7.75 = 21.3	2.0 × 1.5 = 3.0
3.6 × 6.75 = 24.3	2.1 × 2.5 = 5.2
5.1 × 5.75 = 29.3	2.3 × 3.5 = 8.1
6.6 × 4.75 = 31.4	2.75 × 4.5 = 12.4
7.9 × 3.75 = 29.6	3.6 × 5.5 = 19.8
9.3 × 2.75 = 25.6	5.1 × 6.5 = 33.2
10.2 × 1.75 = 17.8	6.6 × 7.5 = 49.5
11.0 × .75 = 8.2	7.9 × 8.5 = 67.1
11.7 × .25 = 2.9	9.3 × 9.5 = 88.3
12.4 × 1.25 = 15.5	10.2 × 10.5 = 107.1
12.7 × 2.75 = 25.6	11.0 × 11.5 = 126.3
12.8 × 3.25 = 41.4	11.7 × 12.5 = 146.3
13.7 × 4.25 = 58.2	12.4 × 13.5 = 167.5
14.8 × 5.25 = 77.6	12.7 × 14.5 = 184.3
2.9 × 6.25 = 18.1	12.8 × 15.5 = 198.7
1.9 × 7.25 = 13.8	13.7 × 16.5 = 226.3
1.5 × 9.50 = 14.1	14.8 × 17.5 = 259
155.1 × 144 = 22,4[illegible]#	2.9 × 18.5 = 53.7
-339.9	1.9 × 19.5 = 37.0
+227.6	1.5 × 21.0 = 31.0
= 118.2	72.[illegible] × 144 = 329,5822 1#
115.5 × 144 = 17,[illegible]	
× 1.5	

ICE MOMENT 15,000 × 10.5 = 157,500#
WATER PRESSURE 21,950#
179,500#
- 142,800
322,300 OVERTURNING MOMENT

UPLIFT MOMENT

2 × 15 × 7.5 = 225
$2.9 \times \frac{15}{2} \times 10.0 = 225$
3 × 11.4 × 16.5 = 564
4.5 × 10 × 23.0 = 1,035
$2.0 \times \frac{10}{2} \times 24.67 = 246.7$
2,288.2 × 62.4 = 142,800 1#

$$F. \text{ of } S. = \frac{497,447}{322,300} = 1.54$$

BENJAMIN L. SMITH & ASSOCIATES
ENGINEERS

COMPUTED BY: NELSON TYRRELL — SUBJECT: VLY RESERVOIR DAM — SHEET NO. 16 OF 40

SPILLWAY SECTION

CHECKED BY

DATE: AUG. 23, 1955

IF ICE THRUST IS 10,000 # LIN. FT. INSTEAD OF 15,000 THEN ICE MOMENT IS → 120,000 #

192

~~267,000 OVERTURNING~~

$F.S. = \frac{477,447}{259,000} = 1.85$

GEO. MYRICK SAID THE ABOVE FACTOR'S OF SAFETY ARE O.K. DAVIS PG 30 HANDBOOK OF APPLIED HYDRAULICS SAYS BETWEEN 2 & 3 FOR F. OF S. AGAINST OVERTURNING

SAY BASE WIDTH IS 18.5' - SEE DASHED LINES SHEET 10B

$f = \frac{P}{A} \pm \frac{MC}{I}$ WHERE f IS THE SOIL PRESSURE

$P_\alpha = 22,400^{\#}$ WT. OF DAM

$44 \text{ ft}^2 \times 62.4 = 2,750^{\#}$ $P_\beta = 2,750^{\#}$ WT. OF WATER (THIS AMOUNT COULD VARY)

$P = 25,150$

$A = 18.5 \text{ FT}^2$

$\frac{P}{A} = \frac{25,150}{18.5} = 1,365^{\#} \text{FT}^2$

M_α = ICE MOMENT = $10,000 \times 12' = 120,000'^{\#}$ (COULD VARY)

M_β = HYD. PRESS. MOMENT = $22,000'^{\#}$

M_γ = GRAVITATIONAL RES. MOM. = $-17,050'^{\#}$

M_δ = UPLIFT MOMENT $11,360'^{\#}$ (COULD VARY)

153,366
-17,050
136,316

UPLIFT AREA 291.2
- 3.5×5.0×7.5 = 131.5
- 3.0×11.4×4.25 = 145.0
+ 2.05 3.9×1.77 = 13.7
- 9.25 2.0×1.12 = -21.5
- 9.25 $\frac{1.15}{2}$ 3.25 = -13.5
-104.0
182.2

$182.2 \times 62.4 = 11,360^{\#}$

$M_{MAX} = 136,320'^{\#}$

$C = 9.25'$

$I = \frac{bh^3}{12} = \frac{1 \times 18.5^3}{12} = \frac{6330}{12} = 527 \text{ ft}^4$

$\frac{MC}{I} = \frac{136,320^{\#} \times 9.25'}{527} = 2,392^{\#}/\text{FT}^2$ GIVES NEG. PRESSURE

BENJAMIN L. SMITH & ASSOCIATES
ENGINEERS

COMPUTED BY [illegible] SUBJECT [illegible] DAM SHEET NO. 23 OF 40

SPILLWAY SECTION

CHECKED BY

DATE

[illegible]

$M_{_} = $ [illegible] [illegible]

$M_{_} = $ [illegible] $\times 7.5 \times (\ldots + 1.5) =$ [illegible]

$M_{UP} = $ [illegible] $=$ [illegible]

M_{RT} 209,500# [illegible] [illegible] [illegible]

26,600#
− 5,930
20,670#

9.9 × 0.5 = 5.0
[illegible] × 1.5 = 16.7
11.7 × [illegible] = 29.2
12.[illegible] × 3.5 = 43.4
12.8 × 4.5 = 57.6
13.0 × 5.5 = 71.5

$\frac{267,070}{20,670} = 12.93$

12.9 × 6.5 = 83.8
12.4 × 7.5 = 93.5
12.2 × 8.5 = 103.7
11.7 × 9.5 = 11[illegible]
10.9 × 10.5 = 114.5
10.1 × 11.5 = 116.1
9.2 × 12.5 = 115.0
8.2 × 13.5 = 110.6

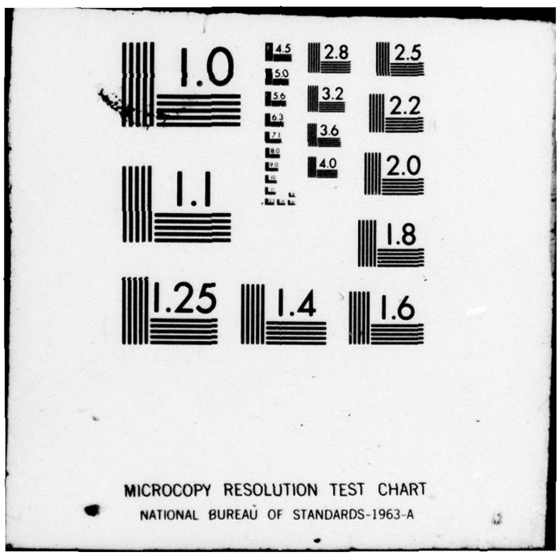
$\frac{209,500}{26,600} = 7.87$

7.0 × 14.5 = 1[illegible].5
5.9 × 15.5 = 91.4
4.6 × 16.5 = [illegible]
[illegible] × 17.5 = [illegible]
2.1 × [illegible] = [illegible]
.8 × 17.5 = [illegible]
1933.[illegible] [illegible] 209,500#

SEPT. 1

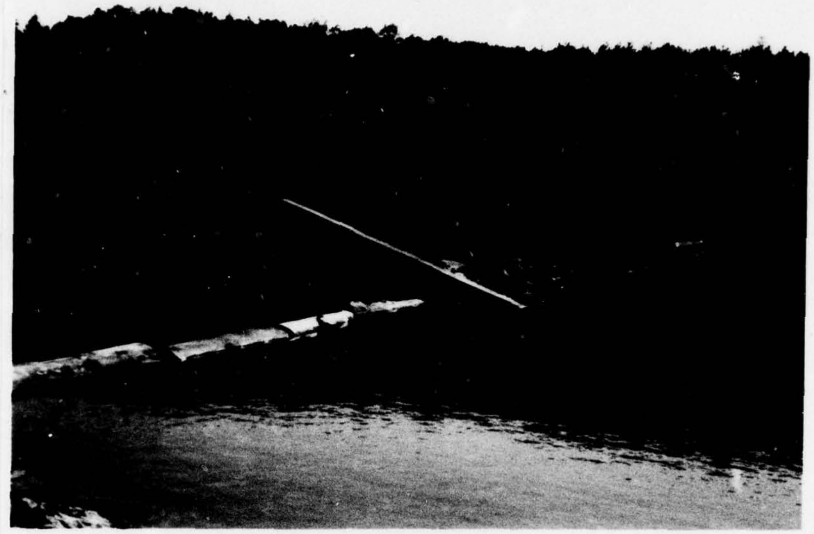
AD-A071 974 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/2
NATIONAL DAM SAFETY PROGRAM. VLY CREEK DAM, INVENTORY NUMBER NY--ETC(U)
SEP 78 G KOCH DACW51-78-C-0035

UNCLASSIFIED NL


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

PHOTOGRAPHS

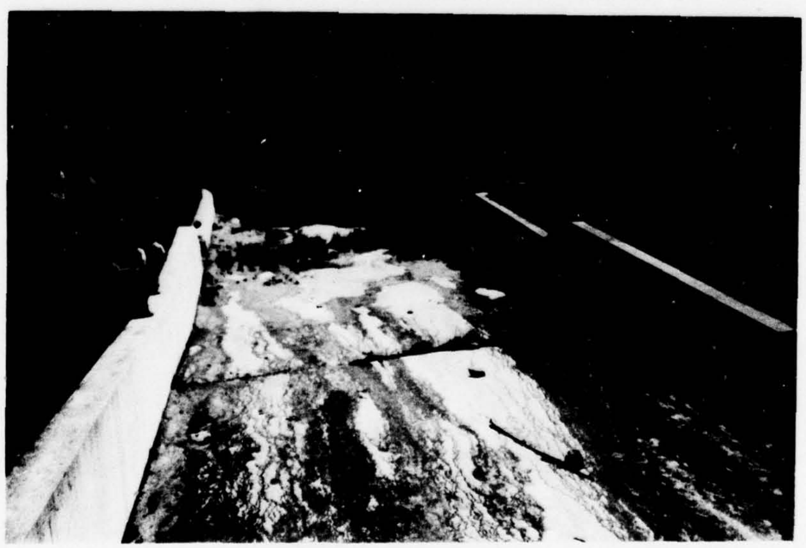
APPENDIX B



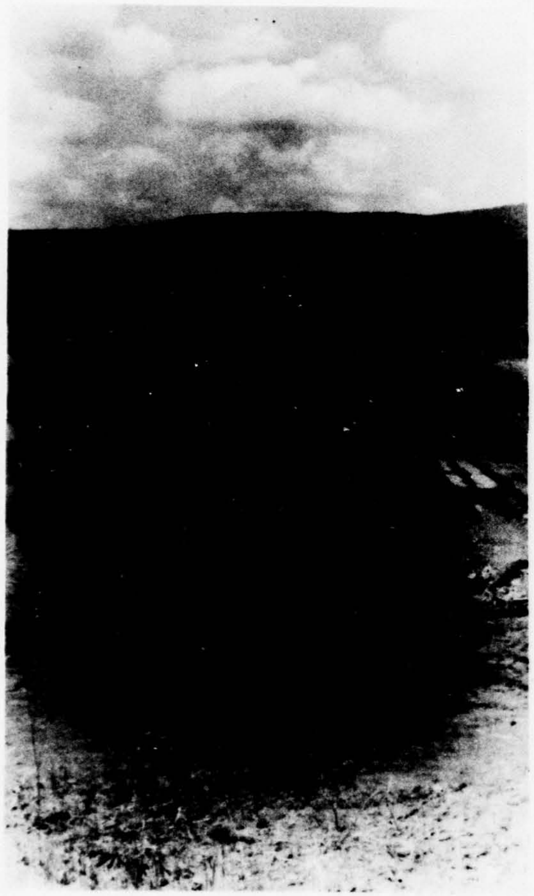
Spillway and Dam Embankment
looking west

Dam Embankment
looking east

Ogee Spillway with Flashboards
looking north



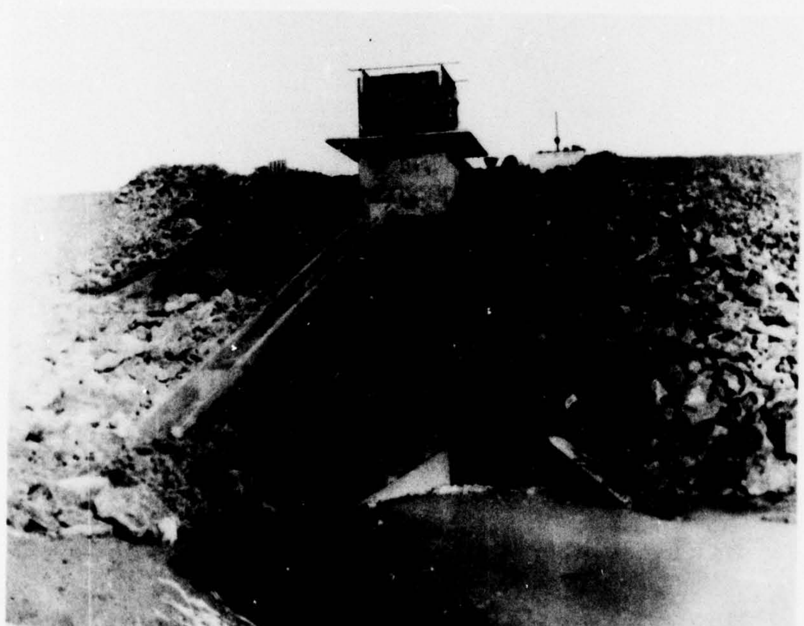
Spillway Chute and Downstream Channel
looking south



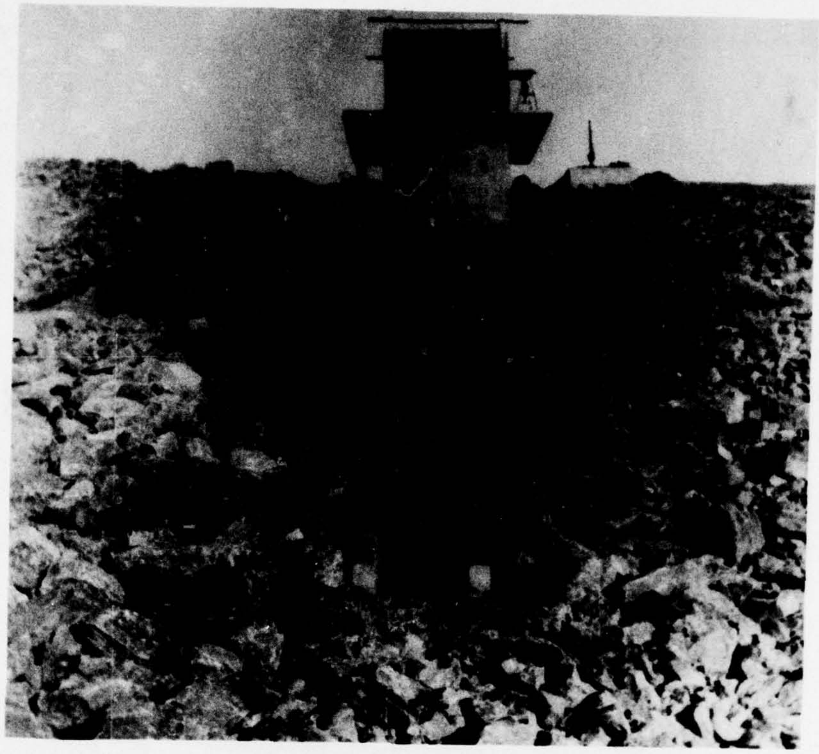
Construction Photo of Dike Embankment
looking west

Dike Embankment
looking west

Dike Construction: Sheet Piling Core Wall and Intake Structure looking north



Dike Construction: Gate House, Intake Structure, and Low Level Outlet



Dike Construction: Intake Structure and Gate House
looking north

ENGINEERING DATA CHECKLIST

APPENDIX C

Check List
Engineering Data
Design Construction Operation

Name of Dam ____________

I.D. # ____________

Item	Remarks		
	Plans	Details	Typical Sections
Dam	Yes	Yes	Yes
Spillway(s)	Yes	Yes	Yes
Outlet(s)	Yes	Yes	Yes
Design Reports	None Available		
Design Computations	Yes, but Limited		
Discharge Rating Curves			
Dam Stability	Stability of spillway section		
Seepage Studies	None		
Subsurface and Materials Investigations	Yes		

Item	Remarks
Construction History	None, only construction photographs
Surveys, Modifications, Post-Construction Engineering Studies and Reports	Installation of flashboards Additional riprap at east abutment of dam 1968 Repair of joints in spillway slabs & walls 1970
Accidents or Failure of Dam Description, Reports	none
Operation and Maintenance Records Operation Manual	Available at water district #1 headquarters no operation manual Readings of reservoir level 2 times a week Discharge to plant recorded daily

VISUAL INSPECTION CHECKLIST

APPENDIX D

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Vly Creek

I.D. # NY 96 & NY 97 / DEC # 208-2378/9

Location: Town New Scotland County Albany

Stream Name Vly Creek

Tributary of Coeymans Creek

Longitude (W), Latitude (N) 74°57'36", 42°36'54"

Hazard Category High

Date(s) of Inspection July 13, 1978

Weather Conditions Clear 78°F

b. Inspection Personnel G. Koch, K. Harmer, W. Coleman
M. Islam, W. Lynick, R. McCarty

c. Persons Contacted Joseph Von Ronne Chief Superintendent
Paul Andress Asst. Super.

d. History:

Date Constructed 1957

Owner Town of Bethlehem Water District # 1

Designer Benjamin L. Smith Consulting Engineers

Constructed by D.A. Collins

2) Technical Data

Type of Dam Earth Embankment

Drainage Area 2.5 sq. mi

Height DAM 24.5', DIKE 39.5' Length DAM 338', DIKE 1720'

Upstream Slope 1:3 Downstream Slope 1:2.5

2) Technical Data (Cont'd.)

External Drains: on Downstream Face NONE @ Downstream Toe NONE

Internal Components:

Impervious Core concrete & steel sheet piling

Drains NONE

Cutoff Type concrete & steel sheet piling

Grout Curtain NONE

3) Embankment

a. Crest

~~(1)~~ Vertical Alignment Some minor settlement of crest of dike

(2) Horizontal Alignment good

(3) Surface Cracks none

(4) Miscellaneous grass covered slopes, mowed 2 to 3 times each year

b. Slopes

(1) Undesirable Growth or Debris, Animal Burrows minor growth of vegetation in the riprap of the dike

(2) Sloughing, Subsidence or Depressions none

(3) Slope Protection Riprap on reservoir side of dike & dam: good condition

(4) Surface Cracks or Movement at Toe none

(5) Seepage none

(6) Condition Around Outlet Structure good

c. Abutments

(1) Erosion at Embankment and Abutment Contact

none

(2) Seepage along Contact of Embankment and Abutment

none

(3) Seepage at toe or along downstream face none

d. Downstream Area - below embankment

(1) Subsidence, Depressions, etc. • none observed

(2) Seepage, unusual growth Large wet area below toe of dike assumed to be seepage from eastern hillside not from reservoir, considerable growth beyond toe of dam, not objectionable

(3) Evidence of surface movement beyond embankment toe

none

(4) Miscellaneous

e. Drainage System

none

(1) Condition of relief wells, drains, etc. ______________________

none

(2) Discharge from Drainage System ______________________

none

4) Instrumentation

(1) Monumentation/Surveys

fixed elevations c) spillway crest and intake tower

(2) Observation Wells none

(3) Weirs none

(4) Piezometers none

(5) Other

5) Reservoir

a. Slopes good condition

b. Sedimentation no problems reported

6) Spillway(s) (including tail race channel)

a. General Approach channel not visible, logs to keep trash & ice away from flashboards, spillway chute walls cracked at both abutments and cracks on construction joints (minor)

b. Principle Spillway 7 feet from crest to top 49' 9" wide 3' flashboards in place 6' 4" from reservoir level to top of dam very little water leaking thru flashboards some growth of vegetation behind flashboards algae growth on ogee section ≈ 5/8 of exposed area

c. Emergency or Auxiliary Spillway

none

d. Condition of Tail race channel considerable debris in trail race channel, ie algae rocks logs and clumps of vegetation - growth in joints of concrete slab

e. Stability of Channel side/slopes good

7) Downstream Channel

a. Condition (debris, etc.) considerable vegetation

no riprap below concrete chute

swamp ≈ 300 feet below spillway

b. Slopes good condition

c. Approximate number of homes 3 homes downstream of dam, village of New Salem on north side of dike

8) Miscellaneous Low level outlet 36" RCP in good condition personnel report low level outlets & reservoir drains in operational capacity

9) Structural

a. Concrete Surfaces generally good

b. Structural Cracking minor cracking of spillway walls at abutments and along construction joints

c. Movement - Horizontal & Vertical Alignment (Settlement)

none observed

d. Junctions with Abutments or Embankments

good condition

e. Drains - Foundation, Joint, Face

none

f. Water passages, conduits, sluices operational condition reported - structurally sound

g. Seepage or Leakage none

h. Joints - Construction, etc.

no problems

i. Foundation good condition

j. Abutments good condition

k. Control Gates Reported operational
some difficulty in closing -
found to be from debris clogging intake

l. Approach & Outlet Channels
structurally sound where observed

m. Energy Dissipators (plunge pool, etc.)
none

n. Intake Structures operational, good condition

o. Stability no problems visually

p. Miscellaneous

HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX E

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	397	209	4,500
2) Design High Water (Max. Design Pool)	395	197	4,000
3) Auxiliary Spillway Crest	-	-	-
4) Pool Level with Flashboards	393	190	3,600
5) Service Spillway Crest	390	183	3,100

DISCHARGES

	Volume (cfs)	Volume (cfs.) with flashboards
1) Average Daily	-	6.2
2) Spillway @ Maximum High Water	3200	1,350
3) Spillway @ Design High Water	1900	450
4) Spillway @ Auxiliary Spillway Crest Elevation	-	-
5) Low Level Outlet	18	18
6) Total (of all facilities) @ Maximum High Water	3,218	1,368
7) Maximum Known Flood	-	20

~~CREST~~: DAM ELEVATION: 397

Type: Earth

		DAM	DIKE
Width: 15 feet	Length:	338	1,720

Spillover Ogee

Location East side of embankment

SPILLWAY:

PRINCIPAL		EMERGENCY
390	Elevation	–
Ogee	Type	–
49.75 feet	Width	–
	Type of Control	
3 feet high flashboards	Uncontrolled	–
	Controlled:	
–	Type (Flashboards; gate)	–
–	Number	–
–	Size/Length	–
	Invert Material	–
	Anticipated Length of operating service	–
198 feet	Chute Length	
14	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate ______ Sluice ______ Conduit ✓ Penstock ______

Shape : Circular

Size: 3' Φ under dam, 3½' Φ under dike.

Elevations: ~~Entrance~~ Invert 372.75 under dam, 355.5 under dike

Exit Invert —

Tailrace Channel: Elevation 372

HYDROMETEROLOGICAL GAGES:

Type : None

Location: ______

Records:

Date - ______

Max. Reading - ______

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

Through conduits mentioned above.

DRAINAGE AREA: 2.52 square miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Woods

Terrain - Relief: Steep slope

Surface - Soil: Albia, alluvial, canfield, farmington, Langford, Lordstown.

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

None

Potential Sedimentation problem areas (natural or man-made; present or future)

None

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: North side of reservoir

Elevation: 397

Reservoir:

Length @ Maximum Pool 2.1 (Miles)

Length of Shoreline (@ Spillway Crest) 4.8 (Miles)

Spillway Rating Curve

Discharge over the ogee spillway without flashboards.

$C = 3.27 + 0.40 \frac{H}{h}$ where H = measured head above crest

h = height of weir

$Q = CLH^{3/2}$ C = Coefficient of discharge

L = effective length of spillway

El. (ft.)	H (ft.)	h (ft.)	C	L (ft.)	Q (cfs.)	Remarks
391	1	14	3.30	49.75	164	
392	2	14	3.33	49.75	469	
393	3	14	3.36	49.75	869	
394	4	14	3.38	49.75	1,345	
395	5	14	3.41	49.75	1,897	Design flood
396	6	14	3.44	49.75	2,515	
397	7	14	3.47	49.75	3,197	Top of dam

Spillway Rating Curve With Flashboards

For sharp crested weir with reckungular channel

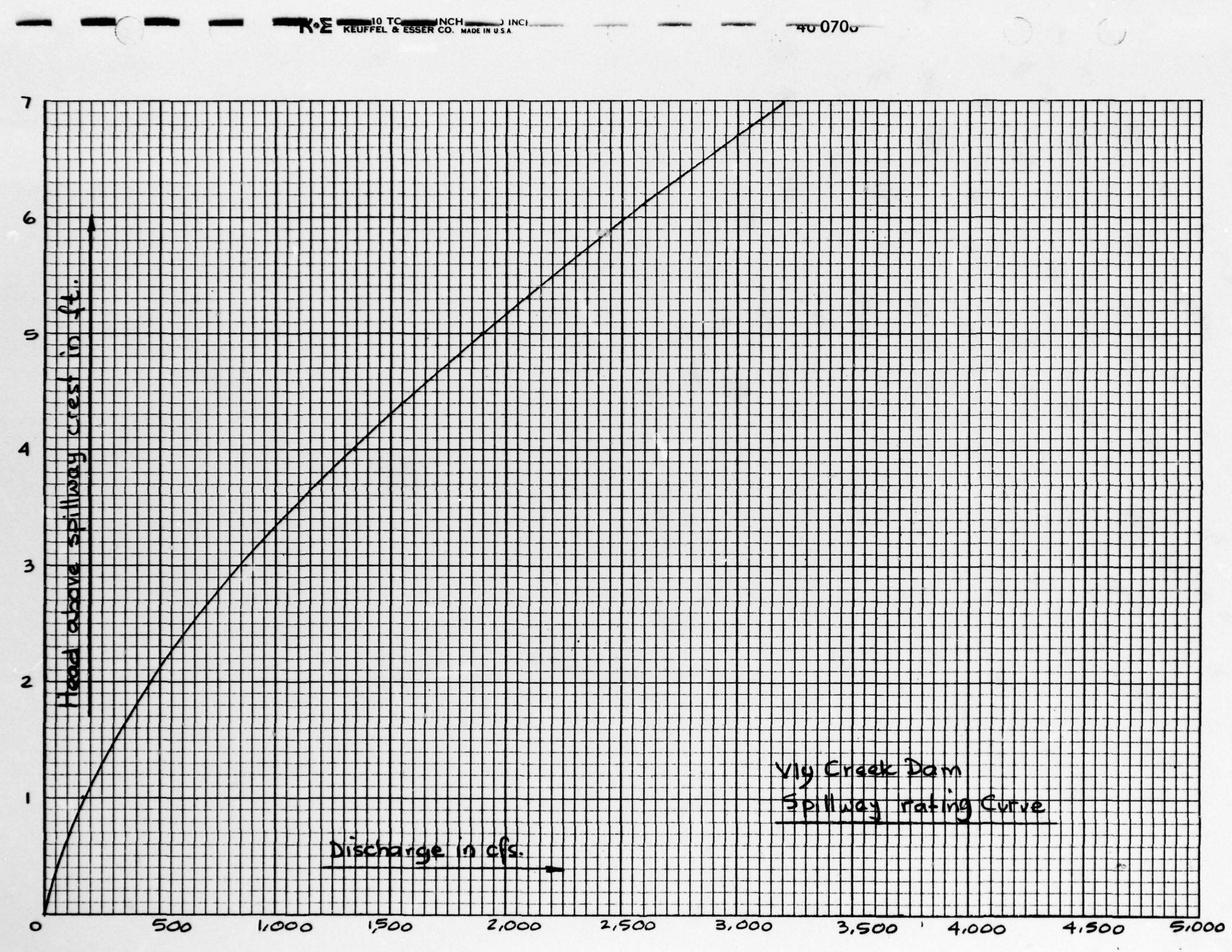
$$C = 3.235 + \frac{1}{60H - .56} + .428\frac{H}{P}$$

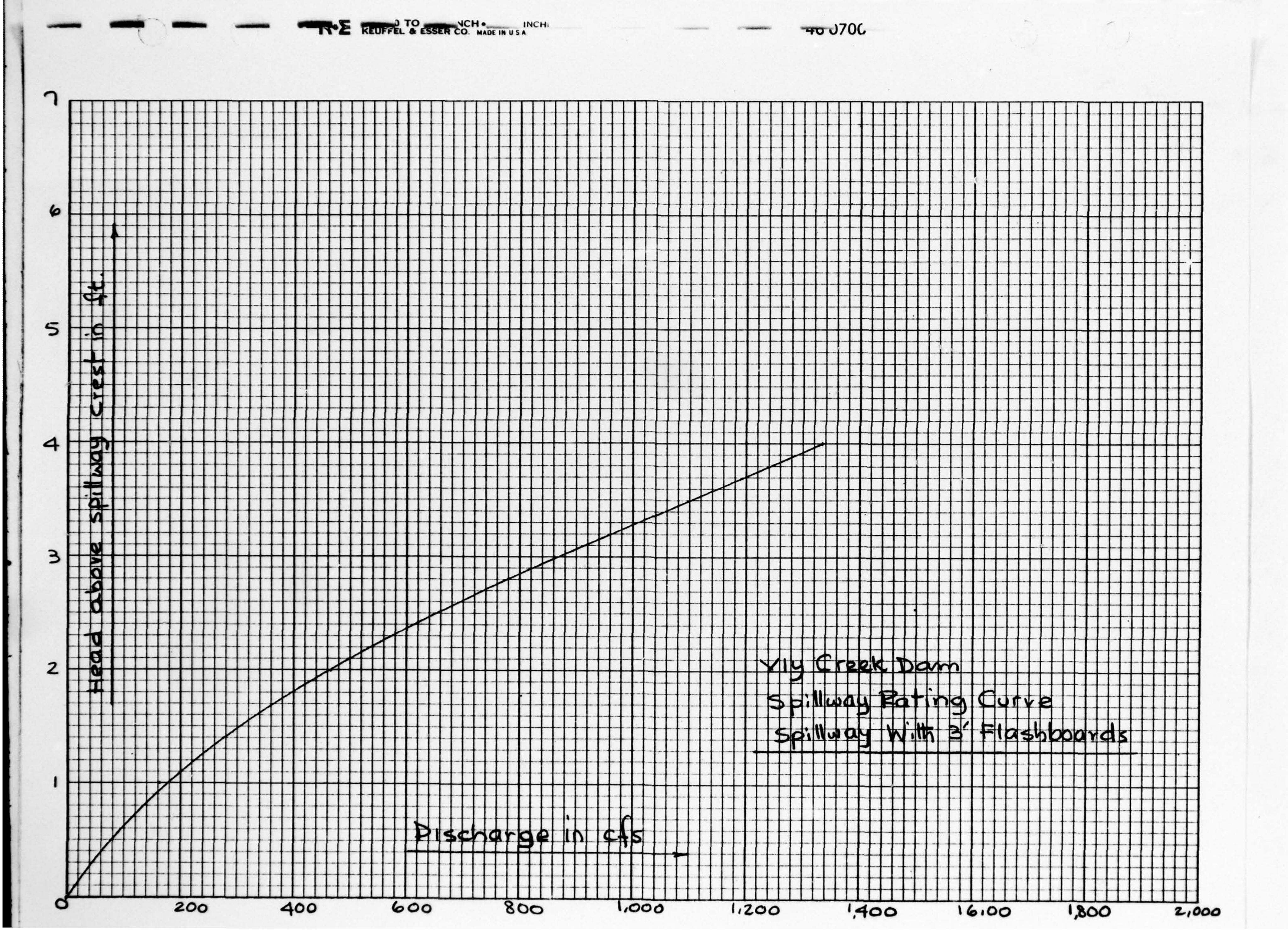
where C = Coefficient of discharge
H = Head of water over spillway
P = Height from bottom to top of spillway.

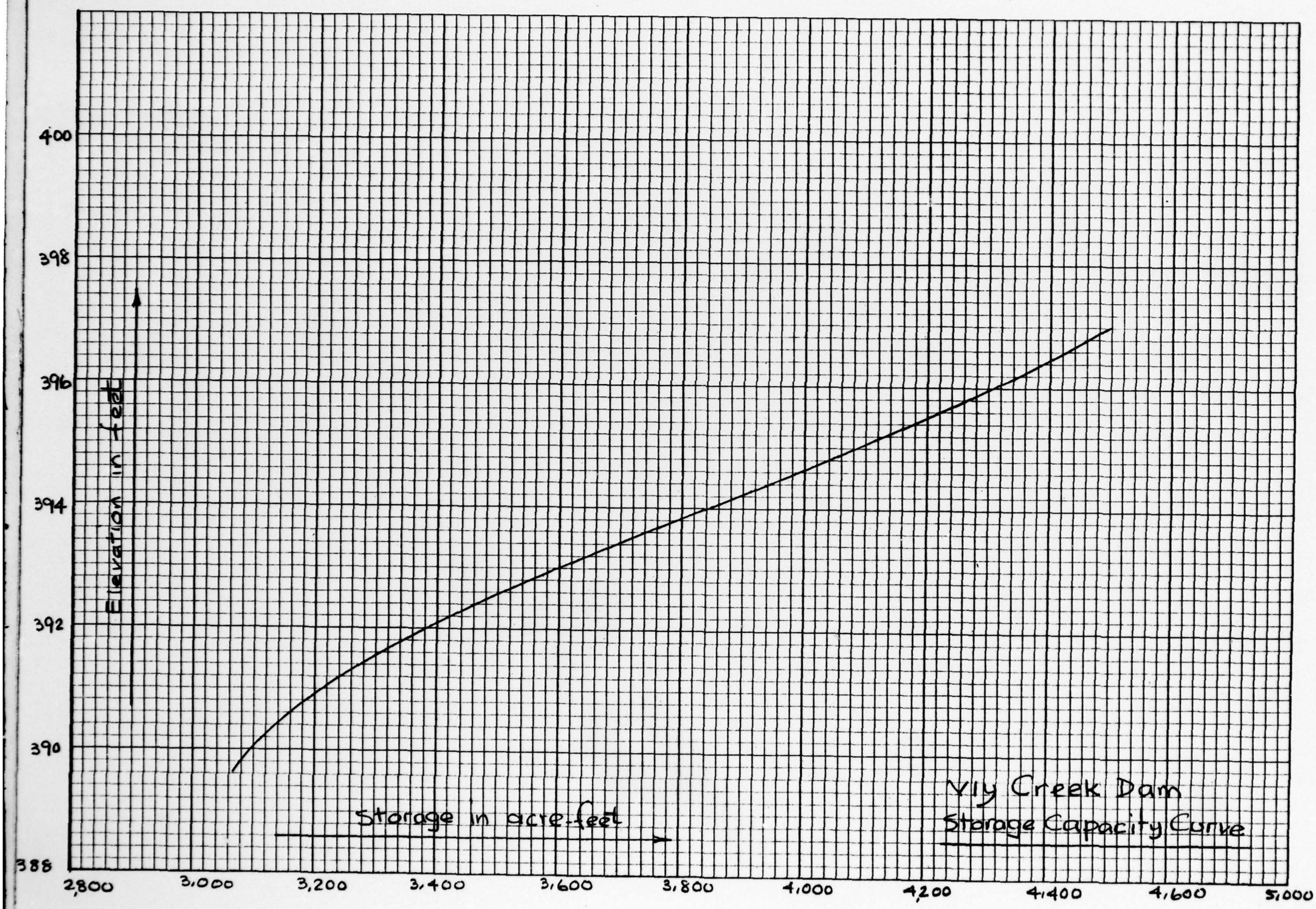
$Q = CLH^{3/2}$ where Q = Discharge over spillway
L = Length of spillway

El. (ft)	H (ft.)	P (ft.)	C	L (ft)	Q (cfs.)	Remarks
394	1	14	3.28	49.75	163	
395	2	14	3.30	49.75	464	Design flood
396	3	14	3.33	49.75	861	
397	4	14	3.36	49.75	1,337	Top of dam

It is assumed that the ogee spillway will behave like a sharp crested weir because of the presence of 3 feet high flashboards on top of the ogee.


K·E 10 TO INCH
KEUFFEL & ESSER CO. MADE IN U.S.A.
Head above spillway crest in ft.
Discharge in cfs.
Vly Creek Dam
Spillway rating Curve
0
500
1,000
1,500
2,000
2,500
3,000
3,500
4,000
4,500
5,000
1
2
3
4
5
6
7


K+E KEUFFEL & ESSER CO. MADE IN U.S.A.
46 0700
Yly Creek Dam
Spillway Rating Curve
Spillway With 3' Flashboards
Head above spillway crest in ft.
Discharge in cfs
0
1
2
3
4
5
6
7
200
400
600
800
1,000
1,200
1,400
16,00
1,800
2,000



Vly Creek Dam
Storage Capacity Curve
Elevation in feet
Storage in acre-feet
400
398
396
394
392
390
388
2,800
3,000
3,200
3,400
3,600
3,800
4,000
4,200
4,400
4,600
5,000

Storage Capacity Curve

ELEVATION (FEET)	STORAGE (ACRE-FEET)
390	3,100
391	3,300
392	3,400
393	3,600
394	3,900
395	4,100
396	4,300
397	4,500

VLY CREEK DAM
UNIT HYDROGRAPH DETERMINATION ✓

DRAINAGE AREA = 2.52 SQ. MI. ✓

L = LONGEST LENGTH = 2.1 MI ✓
LCA = LENGTH TO CENTROID = 1 MI

(1) $t_P = C_t (L L_{CA})^{0.3}$
$= C_t (2.1 \times 1)^{0.3}$ (USE AVG C_t = 2) ✓
$= 2 \quad (1.249)$
$= 2.498$ USE 2.5 HRS

(2) $t_R = \frac{t_P}{5.5} = \frac{2.5}{5.5} = (.45)$ USE 1 HR UNIT HYDROGRAPH

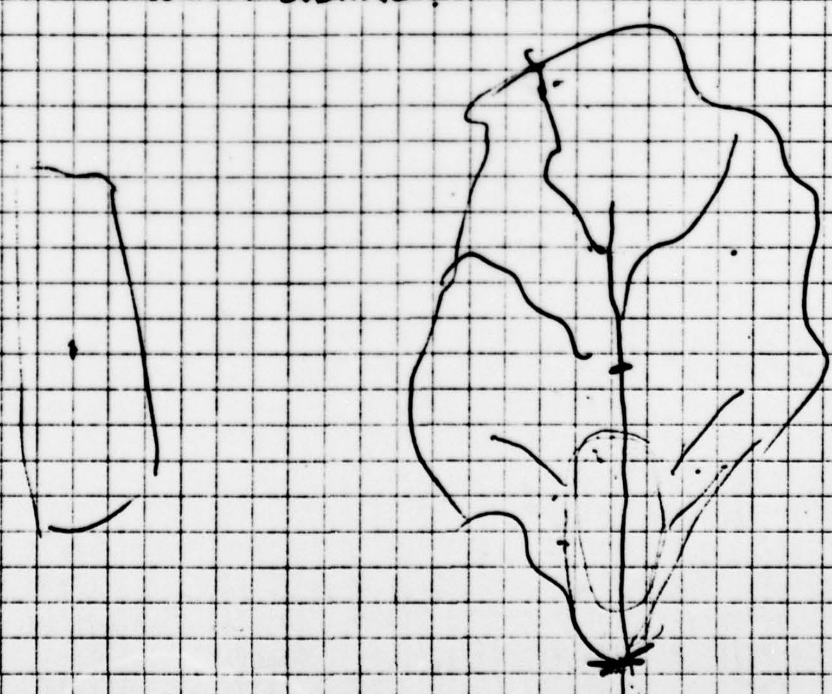
(4) $t_{PR} = t_P + 0.25(t_R - t_r)$
$= 2.5 + .25(1 - .45)$ $= \underline{2.638}$ ✓
$.25(.55)$
$.138$

(5) $q_{PR} = \frac{640 C_P}{t_{PR}}$ USE AVG $640 C_P = \underline{400}$

$= \frac{400}{2.638} = \underline{151.6 \text{ CSM}}$

(6) $Q_P = q_{PR} \times D.A. = 151.6 \times 2.52 = \underline{382 \text{ CFS}}$ ✓ PEAK OF 1 HR UNIT HYDROGRAPH

FROM PLATE NO 7 $W_{75} \approx 2$ HRS
$W_{50} \approx 3.5$ HRS



TS. 9/78

VLY CREEK DAM — D.A. = 2.52 SQ. MI.

HEIGHT = 24.5' LENGTH = 338'

49.75 FT WIDE SPILLWAY CONCRETE OGEE
CREST ELEVATION — 390'
200 FT. LONG REINFORCED CHUTE SECTION

36" ϕ PIPE SERVES AS A RESERVOIR DRAIN

THE RESERVOIR PROVIDES STORAGE FOR THE WATER SUPPLY OF THE TOWN OF BETHLEHEM

TOP OF DAM 397 FT. M.S.L.

THE COMPUTED CAPACITIES AT THE MAXIMUM HEAD ARE 3200 C.F.S. WITHOUT FLASHBOARDS AND 1350 C.F.S. WITH FLASHBOARDS.

LENGTH OF THE RESERVOIR = 2.1 MILES LCA = 1 MILE

RESERVOIR CAPACITY
SPILLWAY CREST — 3100 ACRE-FT.
TOP OF FLASHBOARDS — 3600
TOP OF DAM — 4500

SURCHARGE STORAGE OF 1400 ACRE FT. WHICH IS EQUIVALENT TO A RUNOFF DEPTH OF 10.4 INCHES OVER THE DRAINAGE AREA.

EVIDENTLY DIKE AT NORTHERN END OF DAM BLOCKS UPLAND RUNOFF. RUNOFF IS GENERATED BETWEEN DIKE & DAM.

PROBABLE MAXIMUM PRECIPITATION (FIGURE 1) HMR 33 = 19.5 INCHES

DEVELOP TRANSPOSITION FACTOR $\underline{\underline{TRSPC}} = 1 - \left(\frac{.3008}{(TRSDA)^{.17718}} \right)$

USE 10 SQ. MI. AS POINT RAINFALL

$$= 1 - \frac{.3008}{(10)^{.17718}} = 1 - \frac{.3008}{1.504}$$

$$= 1 - .2 = .8$$

ADJUSTED BASIN PRECIPITATION = 19.5 × .8 = $\underline{\underline{15.6}}$ INCHES

FROM HMR 33 - FIG 2 - DEPTH AREA DURATION

6 HR % = 111	6 HR RAIN = 17.3 INCHES ✓
12 HR % = 123	12 HR RAIN = 19.2 "
24 HR % = 133	24 HR RAIN = 20.75 "
48 HR % = 142	48 HR RAIN = 22.2 "

T.S. 9/78

VLY CREEK DAM M.P.F.

TIME DISTRIBUTION OF MAXIMUM 6 HR RAINFALL

PERIOD	%		
1	10		1.73
2	12		2.08
3	15	x 17.3 INCHES	2.60
4	38	6 HR RAIN	6.58
5	14		2.42
6	11		1.90
	100		17.3 IN ✓

VLY CREEK DAM - MAXIMUM PROBABLE FLOOD

TIME IN HOURS	1 HOUR UNIT HYD	RAIN EXCESS	SURFACE RUNOFF FROM RAIN EXCESS UNITS .21	.21	.21	.21	.21	.21	1.63	1.98	2.50	6.48	2.32	1.80	SUBTOTAL	2 BASE FLOW 2 CFS SQ.MI.	1+2 FLOOD HYDRO
1	120	.21	25														
2	250	.21	53	25													
3	368	.21	77	53	25												
4	308	.21	65	77	53	25											
5	203	.21	43	65	77	53	25										
6	127	.21	27	43	65	77	53	25									
7	76	1.63	16	27	43	65	77	53	196								
8	43	1.98	9	16	27	43	65	77	408	238							
9	25	2.50	5	9	16	27	43	65	600	495	300						
10	14	6.48	3	5	9	16	27	43	502	729	625	778					
11	5	2.32	1	3	5	9	16	27	331	610	920	1620	278		3820	5	3825
12	0	1.80		1	3	5	9	16	207	402	770	2385	580	216	4594	5	4599
13					1	3	5	9	124	251	508	1996	854	450	4201	5	4206
14						1	3	5	70	150	318	1315	715	662	3239	5	3244
15							1	3	41	85	190	823	471	554			
16								1	23	50	108	492	295	365			
17									8	28	63	279	176	229			
18										10	35	162	100	137			
											13	91	58	77			
												32	32	45			
													12	25			
														9			

PLATE # 14

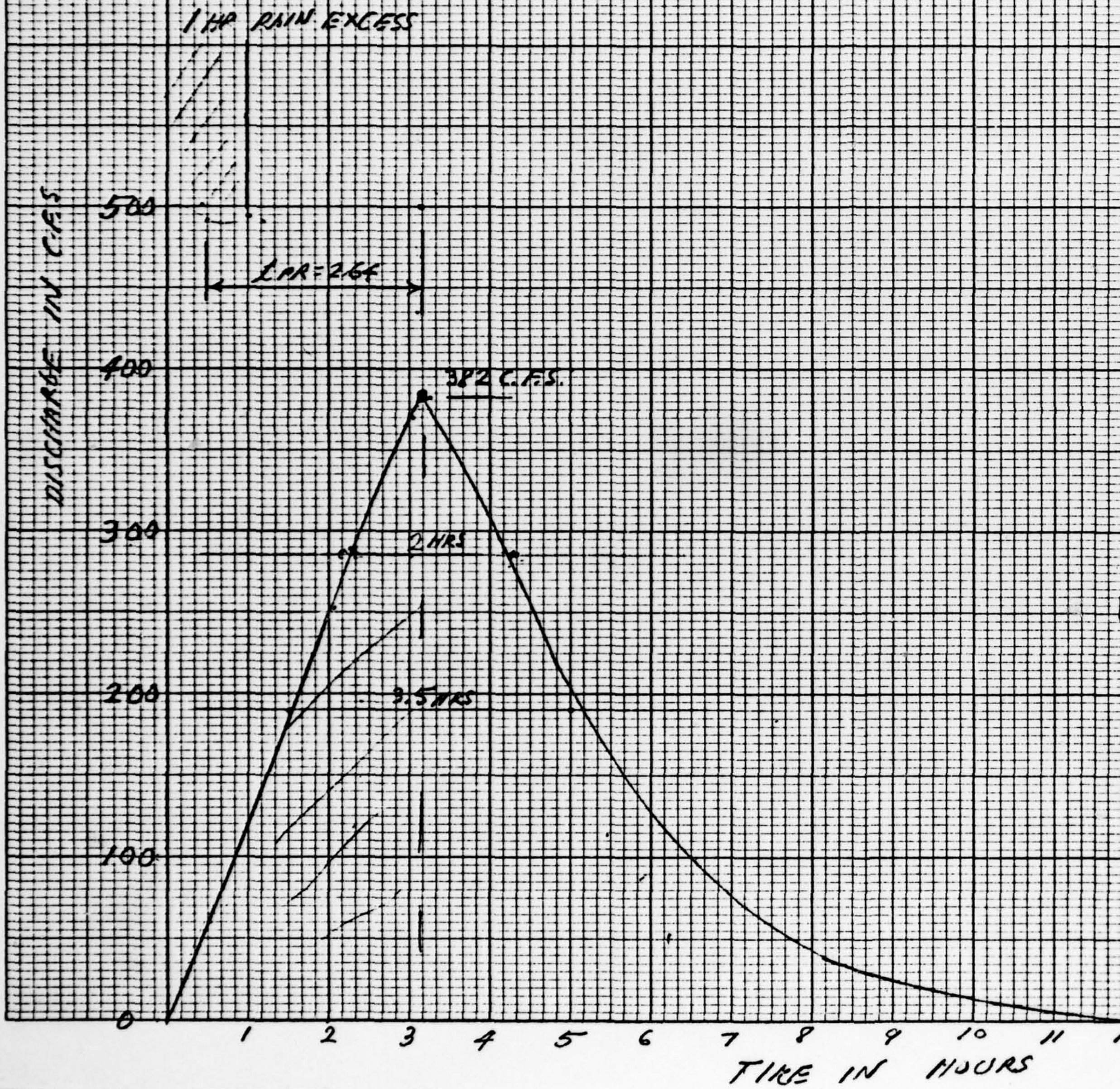
T.S.
9/78

K+E 12 x 20 TO THE INCH • 7 x 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 1970

$\frac{47.8}{40}$ $\frac{57.95}{50}$ $\frac{67.7}{60}$

USE 7.8 SQ IN



$VOL \quad 7.8 \text{ SQ IN} \times \frac{100 FT^3}{SEC} \times 120 MIN \times 60 SEC$

$VOL = 7.8 \times 1.2 \times 6 \times 10^5 FT^3$

$VOL = 56.16 FT^3 \times 10^5$

$VOL = \frac{56.16 FT^3 \times 10^5}{2.52 \text{ SQ MI} (5280 FT)^2}$

$= \frac{56.16 FT^3 \times 10^5}{2.52 \times 27.878 \times 10^6 FT^2}$

$= \frac{56.16}{70.25 \times 10} = .08 FT$

$VOL = .08 \times 12 = .96 IN \approx 1 IN.$

OK UNIT HYDROGRAPH

VLY CREEK DAM
D.A. = 2.52 SQ MI.

VOL=   1023.4

```
SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,6=STOP)   I> 3
ENTER RATIO  IMPERVIOUS =  I> Ø
SELECT 1-3 ( 1=RAIN, 2=SPS, 3=PMS )   I> 1
ENTER NUMBER PERIODS OF RAIN =    I>
ENTER STORM TOTAL (Ø=SUM OF RAIN) (IN) =         .Ø22 CP SECONDS EXECUTION TIME
C>3

 NO PRIMARY ILE.
 UHCOMP
1


 UNIT GRAPH AND HYDROGRAPH COMP JULY 1966 (REVISED AUGUST 1974)
 HYDROLOGIC ENGINEERING CENTER (HEC)
 DAVIS,CA



 --- OPERATIONS AVAILABLE ---

 TIME INT = SET TIME INTERVAL OF ALL COMPUTATIONS
 UNIT H   = COMPUTE UH BY INPUT, CLARK, OR SNYDER
 RAIN     = INPUT RAIN AND LOSS RATE DATA
 RUNOFF   = INPUT BASEFLOW, COMPUTE & PRINT HYDROGRAPH
 PNT      = PRINT UNIT HYDROGRAPH ONLY
 STOP     = STOP EXECUTION OF PROGRAM

 USER MUST SELECT OPERATION DESIRED
 MAY RETURN TO ANY OPERATION

ENTER TIME INTERVAL(MIN)=  I> 6Ø


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,6=STOP)   I> 2
ENTER DRAINAGE AREA (SQMI) =    I> 2.52
SELECT 1-3 (1=INPUT UH, 2=CLARK, 3=SNYDER )   I> 3
ENTER SNYDERS CP AND TP (HRS) =   I> .63 2.64
ENTER INITIAL EST. CLARKS TC & (HRS) (Ø Ø = DEFAULT ) =   I> Ø Ø

       TP       CP        TC       R

     2.27     .568      3.Ø8     1.9Ø
     2.57     .662      3.16     2.ØØ
     2.64     .654      3.16     2.Ø7
     2.66     .645      3.16     2.12
     2.67     .64Ø      3.12     2.15
     2.66     .635      3.12     2.15


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,6=STOP)   I> 3
ENTER RATIO  IMPERVIOUS =  I> Ø
SELECT 1-3 ( 1=RAIN, 2=SPS, 3=PMS )   I> 3
ENTER PMS INDEX RAINFALL (IN) =   I> 19.5
ENTER R6,R12,R24,R48,R72,R96 =    I> 111 123 133 142 Ø Ø
ENTER TRSPC AND TRSDA (SQMI) =    I> Ø 1Ø.
SELECT 1-3 (1=INIT+CONST, 2=ACUM LOSS, 3=SCS)   I> 1
ENTER INITIAL LOSS(IN) AND CONSTANT LOSS(IN/HR) =   I> 1 .1


SELECT 1-6 (1=TIME INT,2=UNIT H,3=RAIN,4=RUNOFF,5=PNT,6=STOP)   I> 4
ENTER A TITLE PLEASE -    I> P M F VLY CREEK DAM
ENTER STRTQ,QRCSN,AND RTIOR =   I> 5 5 1
```

HR	MIN	RAIN	LOSS	EXCESS	UNIT HG	RECSN	FLOW
1	0	.01	.01	0.00	79.	5.	5.
2	0	.01	.01	0.00	262.	5.	5.
3	0	.01	.01	0.00	388.	5.	5.
4	0	.01	.01	0.00	335.	5.	5.
5	0	.01	.01	0.00	212.	5.	5.
6	0	.01	.01	0.00	132.	5.	5.
7	0	.02	.02	0.00	82.	5.	5.
8	0	.02	.02	0.00	51.	5.	5.
9	0	.02	.02	0.00	32.	5.	5.
10	0	.02	.02	0.00	20.	5.	5.
11	0	.02	.02	0.00	12.	5.	5.
12	0	.02	.02	0.00	8.	5.	5.
13	0	.12	.12	0.00	5.	5.	5.
14	0	.14	.14	0.00	3.	5.	5.
15	0	.18	.18	0.00		5.	5.
16	0	.45	.40	.05		5.	9.
17	0	.16	.10	.06		5.	23.
18	0	.13	.10	.03		5.	42.
19	0	.01	.01	0.00		5.	53.
20	0	.01	.01	0.00		5.	47.
21	0	.01	.01	0.00		5.	34.
22	0	.01	.01	0.00		5.	23.
23	0	.01	.01	0.00		5.	16.
24	0	.01	.01	0.00		5.	12.
25	0	.10	.10	0.00		5.	9.
26	0	.10	.10	0.00		5.	8.
27	0	.10	.10	0.00		5.	7.
28	0	.10	.10	0.00		5.	6.
29	0	.10	.10	0.00		5.	6.
30	0	.10	.10	0.00		5.	5.
31	0	.31	.10	.21		5.	22.
32	0	.31	.10	.21		5.	77.
33	0	.31	.10	.21		5.	158.
34	0	.31	.10	.21		5.	228.
35	0	.31	.10	.21		5.	273.
36	0	.31	.10	.21		5.	301.
37	0	1.73	.10	1.63		5.	430.
38	0	2.08	.10	1.98		5.	840.
39	0	2.60	.10	2.50		5.	1530.
40	0	6.58	.10	6.48		5.	2595.
41	0	2.42	.10	2.32		5.	3933.
42	0	1.90	.10	1.80		5.	4784.
43	0	.16	.10	.06		5.	4504.
44	0	.16	.10	.06		5.	3467.
45	0	.16	.10	.06		5.	2367.
46	0	.16	.10	.06		5.	1517.
47	0	.16	.10	.06		5.	982.
48	0	.16	.10	.06		5.	651.
49	0					5.	440.
50	0					5.	294.
51	0					5.	190.
52	0					5.	117.
53	0					5.	70.
54	0					5.	33.
55	0					5.	18.
56	0					5.	10.
57	0					5.	8.
58	0					5.	7.
59	0					5.	6.
60	0					5.	5.
61	0					5.	5.
TOTAL		22.15	3.68	18.47	1621.	305.	30239.

0.60

D 1.86

Max 12HR = 19.2

Max 6 HR = 17.3 IN.

PMF INFLOW 2774 / 30772

1.55 IN = 12 HR

.96

GA-17 (4/70) NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
VLY CREEK DAM AND DIKE	1		
SUBJECT: FLOOD ROUTING (SHORT SCS METHOD)		COMPUTED BY: ISLAM, M	DATE: 9.25.78

Rainfall (PMP) = 19.5 inches

Runoff = 16.8 inches SCS 10.22

$$\frac{\text{Reservoir Detention Volume}}{\text{Inflow Runoff Volume}} = \frac{4500-3100}{\frac{16.8}{12}\times 2.52\times 640} = 0.62$$

$$\frac{\text{Outflow Peak Rate}}{\text{Inflow Peak Rate}} = 0.5 \qquad (17.48)$$

$\therefore$ Outflow Peak Rate = 0.5 x 4800 = 2400 cfs.

LIST OF REFERENCES

APPENDIX F

APPENDIX F

REFERENCES

1. University of the State of New York: Geology of New York, Education Leaflet 20 (Reprinted 1973)

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6. H.W. King and E.F. Brater: Handbook of Hydraulics, 5th edition, McGraw-Hill Book Company (1963)

7. U.S. Department of Commerce: Technical Paper No. 40. Rainfall Frequency Atlas of the United States (1961)